



Munich Personal RePEc Archive

Living with Macro-financial Linkages: Policy Perspectives and Challenges for SEACEN Countries

Reza Siregar and Vincent C.S. Lim

The South East Asian Central Banks (SEACEN) Research and
Training Centre, Kuala Lumpur, Malaysia

15. January 2011

Online at <https://mpra.ub.uni-muenchen.de/28417/>

MPRA Paper No. 28417, posted 26. January 2011 20:46 UTC

Living with Macro-financial Linkages: Policy Perspectives and Challenges for SEACEN Countries

Reza Siregar and Vincent C.S. Lim*

January 2011

Abstract

The deepening financial liberalisation and the tightening of financial integration globally have made it more challenging to manage macroeconomic policies in general, and to contain the spread of financial turbulence in particular. The financial sector has been shown to be inherently pro-cyclical and capable of amplifying macroeconomic volatilities, making management of monetary policy increasingly complex. In these ever changing financial landscapes, the success of monetary policy and macroeconomic policies, in general, hinges on the ability of policy makers to design policies that explicitly take into account macro-financial channels, and to interpret more cautiously the potential risk in financial system disruptions that can rapidly destabilise macroeconomic stability. The objective of this study is to take stock and examine the impact of linkages between macroeconomic development and financial market condition with a special focus on the SEACEN economies.

Key Words: Macro-financial linkages, Macro-prudential, Stress-testing, Cross-border supervision, Basel III.

JEL Classifications: E58, G01, G18 and G28.

*Authors - Reza Siregar (reza@seacen.org) and Vincent, C.S. Lim (cslim@seacen.org) are Director and Senior Economist with the Research and Learning Contents Department of The SEACEN Centre respectively. This paper is prepared for the 9th SEACEN Executive Committee (EXCO) Meeting in Cambodia, January 2011. The responses of SEACEN member banks to the survey questionnaire for this paper are gratefully acknowledged. Editorial and research support from staff of the Research and Learning Contents Department are greatly acknowledged. The views expressed, however, are the authors and do not necessarily represent those of the Centre or the SEACEN member banks.

1. Introduction

The deepening financial liberalisation and the tightening of financial integration globally have made it more challenging to manage macroeconomic policies in general, and to contain the spread of financial turbulence in particular. The financial sector has been shown to be inherently pro-cyclical and capable of amplifying macroeconomic volatilities, making monetary policy management increasingly complex. The recent global financial crisis should have convinced any doubters that the financial system is vulnerable to catastrophic breakdowns that can wreck the world economy (Yellen, 2010). In these ever changing financial landscapes, the success of monetary policy and macroeconomic policies hinges on the ability of policy makers to design policies that explicitly take into account macro-financial channels, and to interpret more cautiously the potential risk in financial system disruptions that can rapidly destabilise macroeconomic stability.

The recent global financial crisis has also rekindled the debate on the proportionality of the central bank's policy with regard to monetary and financial stability objectives. For the past decade prior to the 2007-2009 sub-prime financial crisis, there has been growing confidence among the central bankers around the globe that they have been able to better manage economic fluctuations, including inflation.¹ The overall success of these central banks/monetary authorities in achieving moderate single digit-inflation led central bankers to believe that not only have they conquered inflation, but that they can flatten business cycles as well. Financial imbalances were, however, hidden behind a stable inflation environment.

The objective of this study is to take stock and to examine the impact of linkages between macroeconomic development and the financial market condition. We will revisit the basic framework and available analytical approaches to assess macro-financial environment. Moreover, this study attempts to document the progress and remaining challenges, and what these advancement and outlook mean for the SEACEN economies.²

The outline of this study is as follows. The next section reviews the basic framework of macro-financial linkages. These links are, indeed, nothing new for policy makers in Asia-Pacific. The recent global financial crisis may have, however, exposed us to more complex and intricate linkages. Section III of the paper takes a closer look at recent debates and progress made in the areas of macro-prudential regulations. We review typical macro-prudential measures implemented in most SEACEN economies.

¹ In the same period span, we have also seen an increase in the number of countries adopting inflation targeting policy as the anchor for their monetary policies, especially among the emerging markets. Prior to the 1997 East Asian financial crisis, only five economies adopted inflation targeting policy, and none of them were emerging markets. By the end of 2006, twenty six economies, more than half were developing economies, committed to their own inflation targeting (IT) policies.

² The South East Asian Central Banks (SEACEN) Research and Training Centre group of central banks and monetary authorities was established in 1982. As of January 2011, the group has 16 members, namely Ministry of Finance, Brunei Darussalam; National Bank of Cambodia; Reserve Bank of Fiji; Bank Indonesia; The Bank of Korea; Bank Negara Malaysia; The Bank of Mongolia; Central Bank of Myanmar; Nepal Rastra Bank; Bank of Papua New Guinea; Bangko Sentral ng Pilipinas; Monetary Authority of Singapore; Central Bank of Sri Lanka; Central Bank, Chinese Taipei; Bank of Thailand and State Bank of Vietnam.

Particular attention will be given to two major macro-prudential tools, namely stress-testing and bank supervision. A closer assessment on the need and challenges in conducting cross-border supervisory activities will also be presented. In Section IV, we will review the recent important proposal on capital adequacy ratio breakdowns under Basel III. A brief concluding section ends the paper.

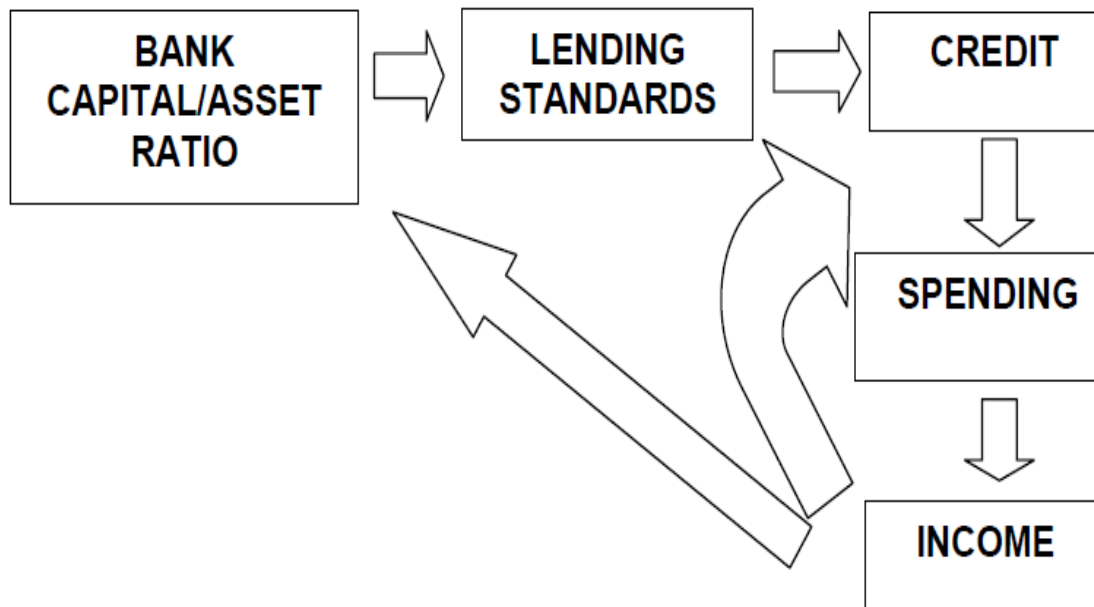
2. Macro-financial Linkages and Consequences

2.1 Frameworks and Concepts

In their recent work, Gray, Merton and Bodie (2007) have argued that the existing monetary policy frameworks are “ill-suited” since their focus is limited to the monetary system. Their view is clearly not new and has already been expressed by many earlier studies. Houben, Kakes and Schinasi (2004), for instance, have maintained that “a financial system is in a range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy, and dissipating financial imbalances that arise endogeneously or as a result of significant adverse and unanticipated events”. This broader definition moves beyond that of the monetary system which simply focuses on individual banks of the banking system, but instead looks at the system in its entirety and the linkages from the financial system to the real economy (Woolford (2001)).

One straightforward framework (Figure 1) to observe the transmissions and implications of macro-financial linkage is provided by a recent paper of Bayoumi and Melander (2008). The study applies this macro-financial channel to explain the recent sub-prime crisis in the US. They assume the occurrence of an adverse shock which has led to the deterioration in the quality of bank capital and its capital adequacy level. In turn, banks are forced to make some adjustments in their lending standards. An ensuing credit crunch which will eventually result in the weakening of investments and spending will further cause income to fall. The study also emphasised the second round or the feedback effect. The slowdown in economic growth would weaken demand for credit. Concurrently, the deterioration of collateral during an economic crisis would further worsen the quality of bank capital. Hence, more macro-financial cycles would likely take place, depending on the severity of the economic and financial crisis.

Figure 1: Macro-financial Linkages



Source: Bayoumi and Melander (2008)

Accepting the proposed macro-financial channel, such as the one proposed above, is arguably the least difficult part. Estimating the impact of these feedback loops is, however, not as straightforward. During a crisis period in particular, the occurrences of a few rounds of adverse feedbacks between the macroeconomic environment and financial condition are common ---also known as rounds of vicious cycles. The consequences of macro-financial channels on the effectiveness of monetary policy, in particular, have also been known to be amplified by the pro-cyclicality nature of the financial system. Financial institutions have demonstrated that they are vulnerable to the collective draw to lend aggressively when times are good, only to excessively cut lending when the economic cycle experiences a downturn. This behaviour amplifies the impact of the economic cycle on bank lending and is termed as “pro-cyclicality”.

The recent sub-prime crisis underscores the severity of the boom and bust consequences of the pro-cyclicality feature of bank lending in particular and activities of the financial institutions in general. To expose the incidence of pro-cyclicality, past studies estimate the degrees of correlation between credit growth and GDP growth. As explained by Craig, Davis and Pascual (2006), real GDP growth has long been considered a standard measure of the business cycle, while real credit growth reflects the role of the financial sector in the cycle. Based on the data series of 11 Asia-Pacific economies, their study further claims that the correlation of credit to GDP is much stronger on average when growth is weak, suggesting that pro-cyclicality is greater during a recession.

The globalised banking system is another factor that needs to be recognised when estimating the feedback consequences between macroeconomic policies and

financial market conditions. Studies have shown that while lending of small banks appear to highly responsive to monetary policy shocks, the same is not true for larger banks. One plausible explanation stems from the presumed greater ability of large banks to substitute reservable deposits with other external sources of funds (Cetorelli and Goldberg (2008)). The same study has further shown that the large US banks with a global network are, indeed, insulated from domestic monetary policy shocks. However, this does not necessarily imply that monetary policy transmission has weakened extensively. Rather, Cetorelli and Goldberg (2008) claim that the lending channel of U.S. monetary policy is easily underestimated if one examines its impacts on the local economy only. Their study examines the response of the foreign offices of these US banks to a change in domestic monetary policy, and finds evidence consistent with an international mechanism of transmission of monetary policy. In addition, Cetorelli and Goldberg (2009) further demonstrates that adverse liquidity shocks to banking in developed countries, such as those that occurred in the United States in 2007 and 2008, have reduced lending in emerging markets through contractions in cross-border lending to banks and private agents and also through contractions in parent banks' support of foreign affiliates. In short, the feedback effects of the macro-financial channels could easily be complicated further by the presence of multiple and concurrent shocks, coming from both local and external sources.

2.2 Lessons from Past and Recent Regional and Global Crises

A seminal work of Kaminsky and Reinhart (1999) on financial, currency and balance of payment crises for the period of 1970 - mid-1995 claims that the beginning of banking-sector problems predate balance of payment-crisis, and indeed, knowing that a banking crisis was underway helps predict a future currency crisis. Casual observation also suggests that the price of assets (real estate, stock price) tends to climb before a crash occurs (Chang and Velasco (1998)). Prices of these assets will typically rise as financial flows, including from abroad, are intermediated by the financial system, and then crash in the event of a bank collapse and economic slowdown.

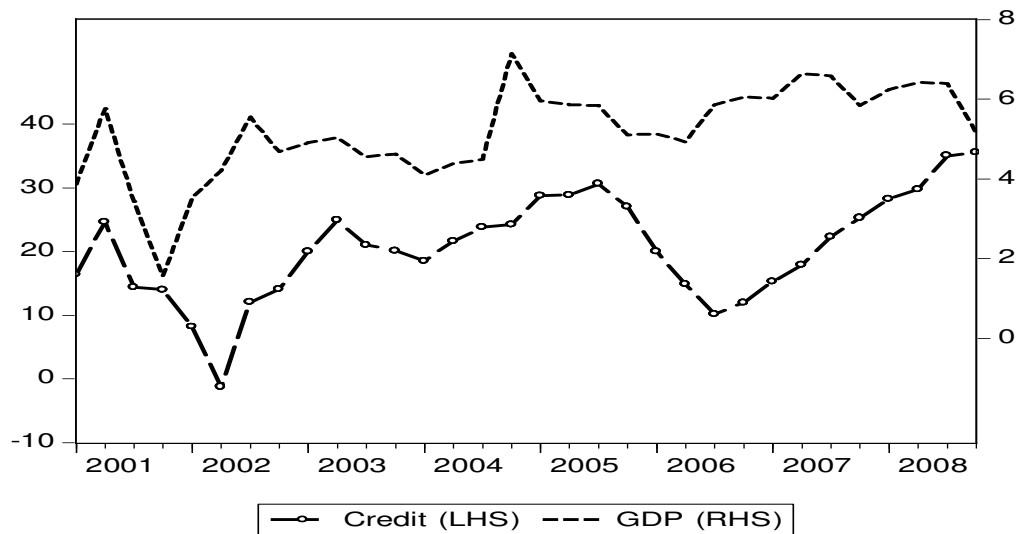
The linkage between the balance of payment and financial crises heightens when the financial market has been liberalised. Since the 1980's, following the liberalisation of financial markets across the globe, banking and currency crises have become closely entwined (Kaminsky and Reinhart (1999)). The opening of the domestic financial sector has often been followed by sudden large influxes of foreign capital, particularly in the form of portfolio investments and banking loans. The 1997 East Asian financial crisis was preceded by notable excessive foreign borrowings (Corsetti, Pesenti and Roubini (1998)).

Figure 2 demonstrates the close relationship between credit and GDP growth for the case of Indonesia. Similar trends can also be found in other parts of Asia.³ In addition, the presence of pro-cyclicality can also be confirmed from the established relationship between accumulations of household debt to GDP growth rates (Figure 3). A simple regression equation relating the two variables indicates that the rise in the GDP (PPP) per capita contributes positively and significantly to the rise in of the

³ For the sake of brevity, only the Indonesian case is illustrated.

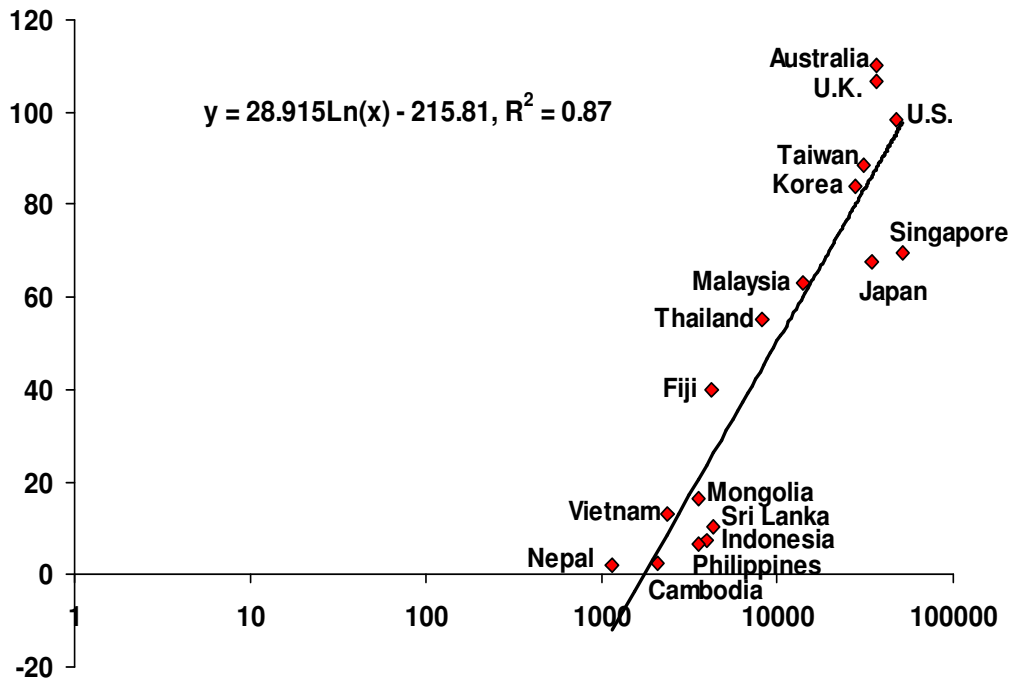
household debt-to-GDP ratio across the seventeen predominantly Asian countries (Nakornthab (2010)).

Figure 2: Annualised Credit Growth and GDP Growth in Indonesia
(in percentages)



Source: CEIC database and Authors' own calculation.

Figure 3: Household Debt-to-GDP Ratio versus Log GDP (PPP) Per Capita, 2008

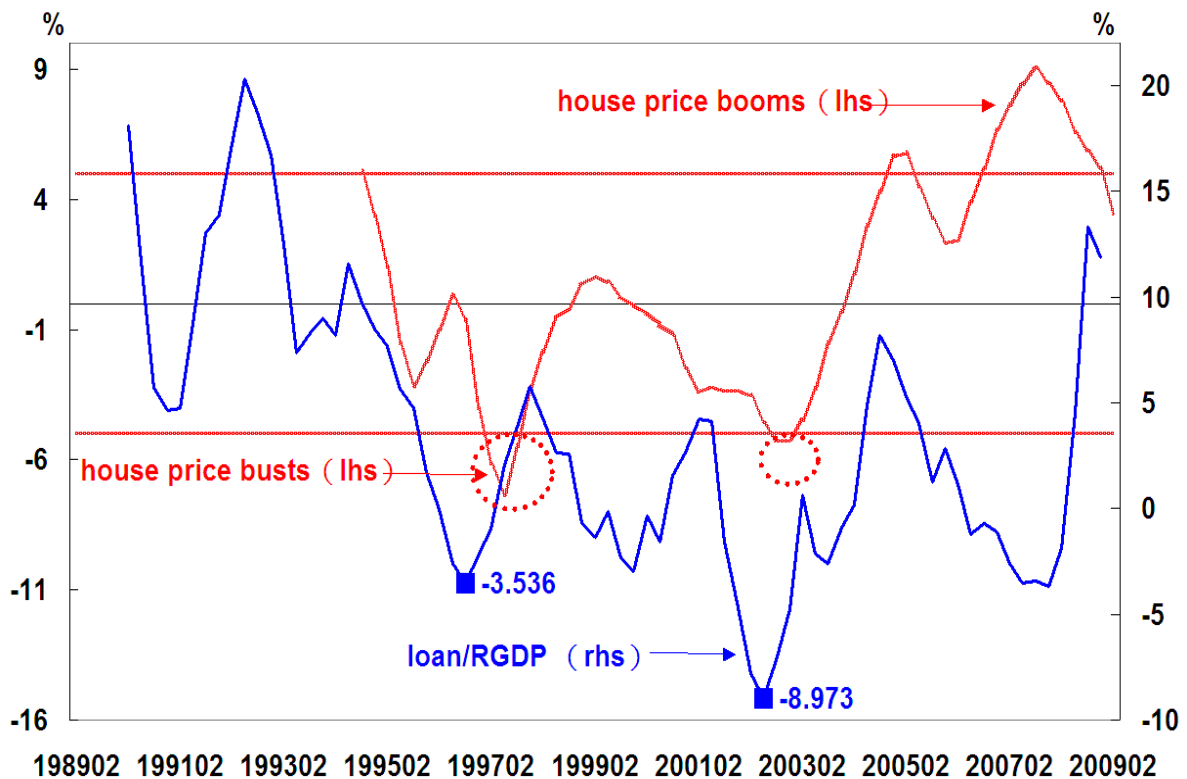


Y =Debt-to-GDP ratio, X=GDP (PPP per Capita)

Source: Nakornthab (2010)

A similar message on the pro-cyclicality nature of the financial sector can also be captured by the relationship between credit growth and asset price (particularly real house prices). As shown in Figure 1, the robust supply of bank loans/credits stimulates rapid spending, especially during the years of soaring economic growth rates. In Asia, the property sector, in particular, has long been attracting a fair share of these consumer/household and commercial loans. Consequently, the availability of the loans during strong economic growths fuelled the concerns of the emergence of bubbles in this sector. Figure 4 vividly illustrates the possible linkage between the availability of loans and house prices in Taiwan. Similarly, the booms and bust of property prices in major Asian economies such as Taiwan, Singapore and the Philippines in particular, have been found to be closely linked to economic cycles. Moreover, Craig, Davis and Pascual (2006) warn that the correlations between property prices and credit growth are often asymmetrical over the economic cycles in Asia. The study demonstrates that property prices are more highly correlated with credit during the downturn.

Figure 4: Loan/RGDP and House Price Booms/Busts in Taiwan

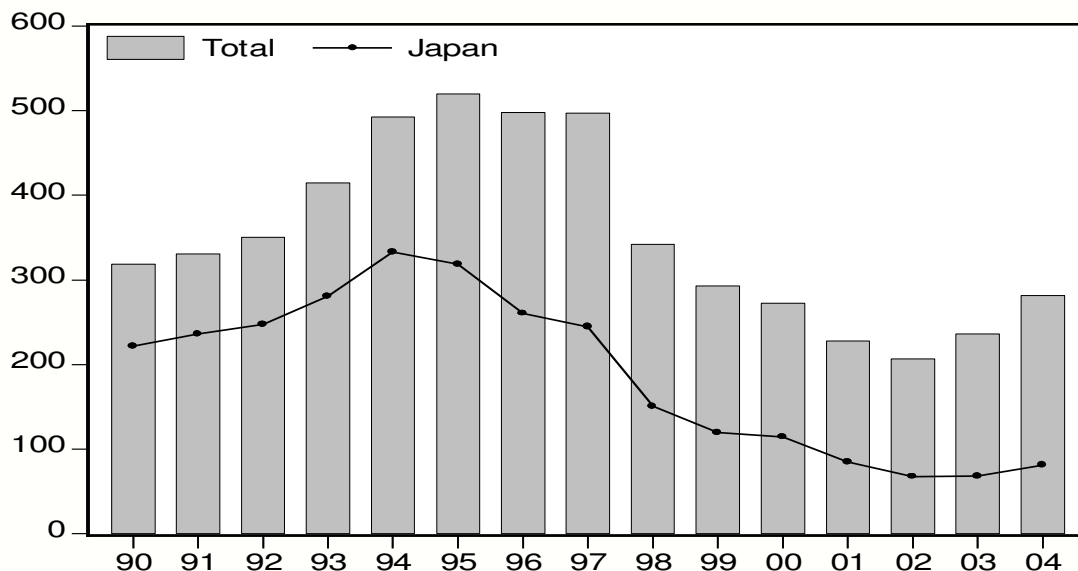


Source: Ho (2010)

The experience with macro-financial linkages in Asia can also be captured by the fluctuations of international bank claims to the region. The globalisation of the banking system is not a recent occurrence in Asia and has, in particular, deepened significantly during the past decade. In their recent paper, Siregar and Choy (2010) find that the size of international bank lending from private banks in seven Organization for Economic

Cooperation and Development (OECD) countries to nine East Asian economies fluctuate in tandem with the economic performance of the recipient countries (Figure 5). Accompanying the collapse of economic growth in major East Asian economies was a sharp decline in loans from commercial banks based in the seven OECD countries. The hardest hit economies, namely Indonesia, Korea, Malaysia, the Philippines and Thailand, which had experienced net private inflows averaging from around US\$160 billion per annum in 1995 and 1996, saw total foreign liabilities drop by around 45 percent in 1998, as international banks were unwilling to roll over existing loans. Siregar and Choy (2010) examined a number of plausible push and pull factors of the OECD banks' claims on the East Asian countries. Among the key factors, they found that bilateral trade between the Asian countries and the OECD economies contributed significantly to the flows of cross-border bank lending, underscoring again the importance of macro-financial linkages.

**Figure 5: Annual International Bank Lending
From Seven OECD Countries' Banks and From Japanese Banks to East Asia**
(in billions of US\$)



Source: Siregar and Choy (2010)

By the end of 2008, arguably the peak of the sub-prime financial crisis, some of the Asian economies have turned from net debtors to net creditors. The gap between international inter-bank liabilities and assets has widened significantly since September 2007. Individually, Australia, Korea, Indonesia, Malaysia, Korea and Vietnam saw a significant build-up of net international interbank debt, suggesting capital inflows in this category while Japan, Hong Kong Singapore, Taiwan saw significant outflows. The combination of the significant roles of foreign banks in the local economies and local banks in the global financial market has naturally, further complicated the efforts to estimate the feedback effects transmitted by the macro-financial channels.

The importance of the macro-financial linkages can easily be perceived from the swift measures taken by Asian central banks to explicitly incorporate financial stability as one of their primary objectives. A score of countries including Malaysia, Singapore,

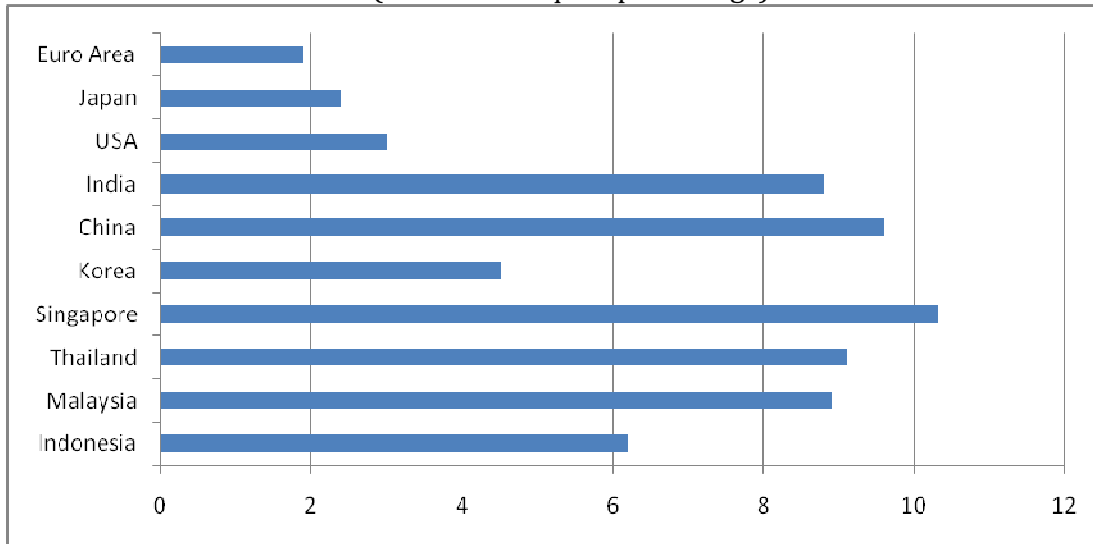
Sri Lanka and Taiwan, for instance, have added financial stability as one of the central bank statutory objectives. Similarly, an increasing number of central banks in Asia such as the Korea and Philippines have proposed amendments to their Central Bank Acts to include financial stability as part of their mandates.

2.3 Going Forward: Braving Volatile Capital Surges

The return of strong capital surges to Asia, including the SEACEN economies, is expected to cause challenges to the management of macroeconomic policies regionally. Asia, being one of the least affected regions by the subprime crisis, is recovering and strengthening with increased resilience, particularly after the second half of 2009 (Figure 6). This is following in the wake of better global conditions underpinned by improved liquidity in the global financial markets. As such, to rein in inflation expectations, many Asian countries, SEACEN included, have implemented tighter monetary policies corresponding to rising costs of borrowing. These exit policies are in direct contrast to those in developed countries where economic recovery is expected to remain weak amidst the existence of uncertainty in the financial sectors and where the interest rate is kept low to spur economic growth. For example, in November 2010, the US Federal Reserve launched another round of quantitative easing (QE2), with intentions to buy treasury bonds totalling US\$600 billion through to the second quarter of 2011.⁴ Combined with about \$300 billion in reinvestment of the Fed's maturing mortgage bonds, total purchases could run as high as \$900 billion, or about \$110 billion a month. The banking crisis in Ireland in November 2010 has also further dented confidence in an already uncertain global financial market. It is estimated that Ireland owes well over \$130 billion to German banks and British banks, respectively. The wide exposure of the crisis to the rest of the Euro market will likely undermine market confidence in the Euro market in the coming months. As such, the widening earning potential between emerging Asian and matured markets should be expected, contributing to further increases in investors' risk appetites and better risk perceptions which is leading to surges in capital inflows, particularly portfolio flows into emerging countries.

⁴ The Federal Open Market Committee indicated that it was compelled to act because "progress" towards their objectives of full employment and stable prices "has been disappointingly slow." This move had been seen as a historic test of unconventional monetary policy by using tools devised during the financial crisis to add fuel to an economy that has been expanding for 15 months.

Figure 6: Gaps in Annualised Growth Rates
(End of 2010 q2 in percentage)



Source: The CEIC database

In addition, the near zero cost of borrowings in the US has resulted in greenback carry-trade where portfolio investments flowed into the regional bond markets, in particular for government securities. During the first 9 months of 2010, it was estimated that around Rp131.13 trillion (or about US\$14 billion) flowed into Indonesia, of which around 62.7 percent and 21.7 percent targeted government bonds and Bank Indonesia securities, respectively. However, the overall bank-related flows remain weak (IIF 2010). On the other side of the equation, in most instances, both financial and non-financial corporations in the SEACEN countries have started to issue additional equity to raise capital, partly to match the higher foreign participation.

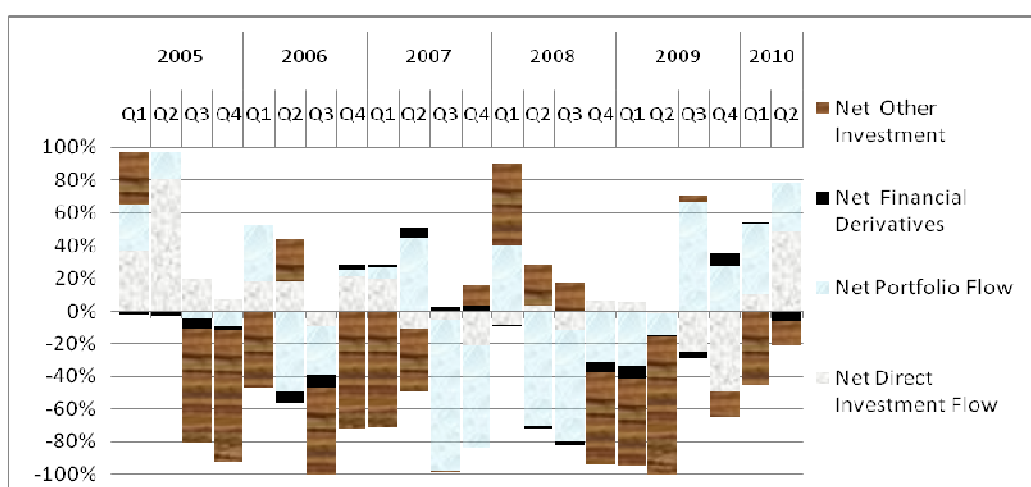
Coinciding with global recovery, capital inflows into the SEACEN region were particularly evident during the third quarter of 2009.⁵ During first-half 2009, the net capital inflows of US\$7.5 billion contrasted sharply with a net outflow of US\$28.5 billion during the second half 2009. The net capital flows continued to register inflows, reaching US\$11.6 billion during 1H2010. Similarly, net direct investment flows also reversed from an outflow of US\$17.8 billion during the second half 2009 to an inflow of US\$11.8 billion during the second half of 2010. Portfolio investment flows also witnessed a large trend reversal, registering inflows of US\$26.7 billion and US\$26.5 billion during second half of 2009 and first half of 2010 respectively, compared to an outflow of US\$3.6 billion in the first half of 2009. Meanwhile, net other investments continued to register outflows of US\$24.1 billion, US\$1.7 billion and US\$ 25.9 billion in first-half of 2009, second-half of 2009 and first half of 2010, respectively.

As expected, net capital inflows during this period was dominated by portfolio flows, particularly after the second-half of 2009 (Figure 7). However, proportion-wise, foreign investments have also started to pick up during the first-half of 2010. The IIF

⁵ Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand.

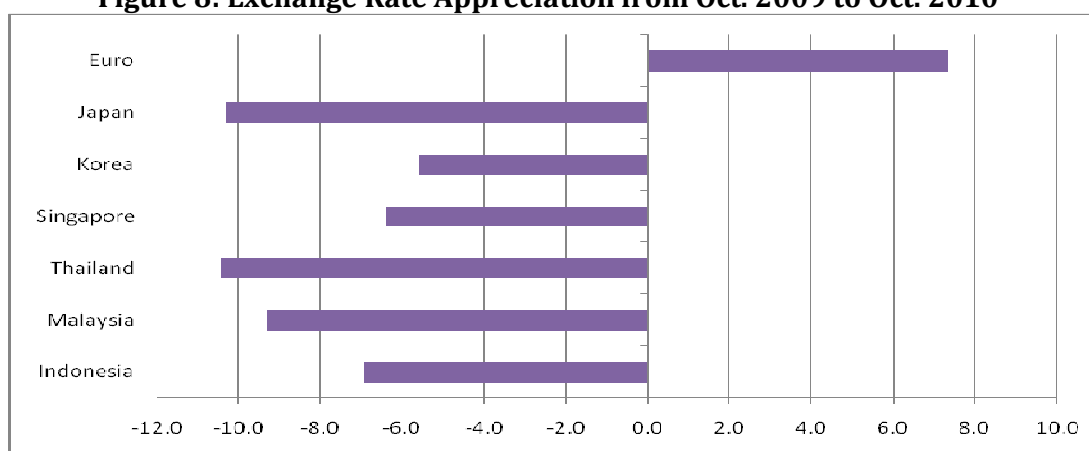
(2010) estimates a net inflow of US\$825 billion to emerging countries in 2010 comprising US\$186 billion in net portfolio investment inflows and US\$366 in net foreign direct investments. If the current portfolio trend continues, the SEACEN region will account for around 30% of all net portfolio flows into emerging countries in 2010, reflecting the huge inflow quantum into the region. As expected, the shift in global asset allocation combined with ample domestic liquidity has led to pressures in the asset price markets and at the same time heightened volatility in the currency market in some SEACEN countries. Currencies of the region appreciated as much as over 10 percent against the US dollar in October 2010 from the previous year (Figure 8). Moreover, inflationary pressures in Asia have been generally higher than those of developed economies (Figure 9). The headline Indonesian inflation rate during the first half of 2010, for instance, doubled that of the first half of 2009.⁶

Figure 7: Composition of Capital Flows



Source: CEIC Database

Figure 8: Exchange Rate Appreciation from Oct. 2009 to Oct. 2010

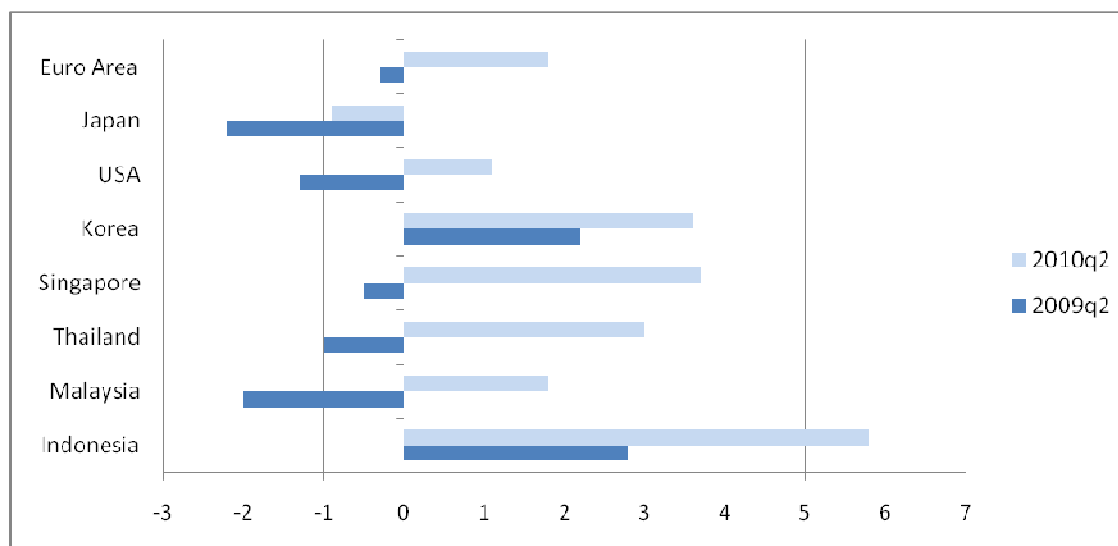


Note: (-) implies an appreciation of local currency.

Source: CEIC database

⁶ The price of food component was largely to blame for the rise in August 2010.

Figure 9: The Return of Inflationary Pressures



Source: CEIC Database

As will be further discussed in later sections, many SEACEN countries have started to implement macro-prudential policies to address financial stability issues (e.g., setting loan-to-value ratio (LTV) (Korea, Malaysia, Singapore), limiting banks' foreign exchange exposure (Korea) and selective capital controls on inflows (non-residents are not permitted to open short-term time deposit accounts (Taiwan)). However, despite these developments, some SEACEN countries, such as Malaysia, Philippines and Singapore have indicated that there are no plans to implement any form of capital flow restrictions in the near future. In addition, subdued inflationary pressures in the last quarter of 2010 have given opportunities for some SEACEN central banks (e.g., Indonesia, Malaysia, the Philippines and Thailand) to maintain interest rates. This has, in effect, helped to prevent the interest rate differential from widening further. However, capital inflows into emerging Asia will probably intensify in the coming months (IIF (2010); ADB (2010); IMF (2010)). As such, the authorities have to consider policies to manage capital flows while maintaining conducive investment-friendly policies to promote robust growth (Konishi 2010). However, as noted by Governor Zeti of Bank Negara Malaysia in October 2010, Asia is now in a much better position to manage surges in capital given that it now has a full array of policy measures compared to the 1997 Asian financial crisis. She also notes that regional cooperation amongst countries in recent years have also contributed to the broader strategies to deal with capital inflows on a regional basis (Business Times, 2010).

3. Enhancing the Effectiveness of Macro Prudential Regulation

3.1 Forging Ahead with Macro-prudential Regulations

Under the present global financial landscape, prudential regulations have been a key option for consideration. The importance of macro-prudential instruments is increasingly recognised with the realisation that conventional key policy interest rate

manipulation is too blunt an instrument. A micro-prudentialist has long argued that for the financial system to be sound, it is necessary that each individual institution be sound. Naturally, the proximate objective of the micro-prudential approach is to limit distress on individual institutions. This approach assumes that risk is exogenous –a partial equilibrium view. In contrast, the macro-prudentialists maintain that there are situations where what is rational for an individual institution could result in undesirable aggregate outcomes. Based on the belief that risk is in part endogenous to the financial system, the objective of the macro-prudential approach is to limit the risk of financial distress with significant losers in the economy as a whole.

Despite the different views, macro and micro-prudential instruments are closely intertwined. The key part of macro-prudential instruments is to fit in existing micro-prudential tools. In general, macro-prudential measures can be categorised into three primary groups. The first are price and quantity-based measures designed to limit credit expansion. Reserve requirements and credit ceilings are typical measures. The second group of regulations aims at maintaining the quality of loans. Typical measures are loan-to-value ratios, debt-to-income rules, limits on currency mismatches and improved credit information. The last group of measures focuses on strengthening the resilience of the banking system to balance sheet shocks (both assets and liabilities). Capital adequacy requirement, rules on the composition and/or types of foreign borrowings are some of the measures falling into this category.

The Committee on the Global Financial System (CFGFS 2010) further classifies macro-prudential instruments by types of vulnerability in the financial system. To manage the leverage position of the banking system, capital ratio, risk weights, provisioning, credit growth, loan to value cap and maturity cap are some of the macro-prudential instruments to be employed. As for the liquidity risk or market risk, authorities can consider one or a combination of the following macro-prudential instruments such as liquidity or reserve requirement, foreign exchange lending restriction and currency mismatch limit. Last, but not least, is the vulnerability arising from interconnectedness. To mitigate this exposure, concentration limits, systemic capital surcharge and strict policy on bank subsidiary are instruments to be regarded.

The enforcement of macro-prudential measures to manage credit cycles is not a new phenomenon in Asia (Table 1). Particularly after the 1997 financial crisis episode, authorities in the region have collectively enforced macro- and micro-prudential regulations to supplement their monetary policy measures. One target area of these policies has often been to manage loan/credit extensions to the property sector. Given the typical significant profit margins from property credit/loans, policy rate adjustments have long been found to be insufficient to address strong credit expansions. The overall primary objective of these prudential measures has also been to prevent systemic risks for overall financial stability, as experienced during the 1997 financial crisis.

Table 1: Selected Prudential Measures for Credit Booms in Asia

	LTV	Capital	Provision	Exposure Limit	Lending Criteria
Cambodia		2009		2008	
China	2001, 2005, 2006				2004
Hong Kong SAR	1991, 1997			1994-1998	
India		2005, 2008, 2009	2005, 2006, 2007	2006	2007
Indonesia		2008		2004, 2005	
Korea	2003, 2006-08				2006
Malaysia	1995-1998	2005, 2008, 2009		1997-1998	1995-1997
Mongolia		2008			
Nepal				2010	
Papua New Guinea		2003	2003	2000, 2001, 2003	
Philippines	1997, 2010			2010	
Singapore	2010			2010	
Sri Lanka		2008		2007	
Taiwan	2010	Pre-2007		Pre-2007	Pre-2007
Thailand	2003				2004-05
Vietnam		2010	2010	2010	

Note: LTV: Loan to Value ratio; Capital = capital requirements/reserve requirement; Provision = loan provisioning rules; Lending criteria = limits on debt repayment-to-income, debt repayment-to-debt or credit line-to-income ratio; Exposure limit = credit exposure to a sector.

Source: Fillardo, et.al. (2010) and SEACEN Questionnaire Survey (October 2010).

In recent years, these macro-prudential measures have been adopted to supplement macroeconomic policy measures by the SEACEN authorities to gradually shift away from the generally expansionary policy stances during the peak of sub-prime crisis. Instead of relying on interest rate policy adjustments, a combination of loan to deposit ratio and reserve requirement policy has been enforced by Bank Indonesia, for instance, to manage credit growth and risk taking in the domestic banking sector. As in the past, the primary objectives of the recent macro-prudential measures are to manage pro-cyclicality and to reduce interconnectivity and systemic risk. To a large part, the SEACEN central banks, as in many other central banks globally, closely monitor pro-cyclical movements in debt and leverages, especially those related to asset markets such as the real estate sector. A key objective of the Singapore government, for example, is to ensure a stable and sustainable property market where prices move in line with fundamentals. In February 2010, the Loan-to-Value (LTV) limit for housing loans extended by financial institutions was lowered to 80%. To discourage speculative flipping of properties, a Seller's Stamp Duty on all residential properties bought and sold within 1 year was introduced. In August 2010, the holding period for imposition of the Seller's Stamp Duty was increased from one year to three years. The Singapore government also tightened measures to ensure public housing is utilised as intended, i.e. for owner occupation.

Bangko Sentral ng Pilipinas has also enforced loan to value ratio requirement as a tool to limit risk exposure of the banking sector to the real estate sector during the

current year. To moderate any excessive investments and speculative activity in the residential property market; effective from 3 November 2010, new housing loans approved by financial institutions and development financial institutions to borrowers who already hold two outstanding housing loan accounts will be subject to a maximum loan-to-value (LTV) ratio of 70%. The Adjustment LTV cap has also been pursued by the Bank of Thailand in recent years.

To manage interconnectivity and risk exposure, Bank Indonesia, on the other hand, monitors daily liquidity positions of banks, especially those institutions that are expected to have more systemic implications. Commercial banks in Indonesia are also prohibited from extending loans to a single affiliated party by more than 10% of the capital. Prohibition on complex derivative asset trading has also been enforced by a number of SEACEN central banks. Nepal Rastra Bank, for instance, imposes limits on investments, except for government and central bank securities. Another typical prudential measure to manage interconnectivity is limiting sectoral credit, including inter-bank placements.⁷ The Central Bank of Sri Lanka introduced the “Direction on Maximum Amount of Accommodation” regulation in 2007 with the main objective of limiting a bank’s credit exposure to any single individual or company or to any groups of individuals or companies.

A recent set of macro-prudential regulations has also been implemented to manage and address the impact of capital inflow surges, especially since the second half of 2009 (Table 2). To reduce short-term volatility, Bank Indonesia (BI) introduced a one-month holding period for its certificate (SBI) purchased in both primary and secondary markets in June 2010. Prior to this, BI launched a concerted effort to shift the maturity structure from one-month to 3- and 6-month tenors and from weekly to monthly auction. Longer maturity SBIs ---SBI-9 months and SBI-12 months--- are being considered in late 2010 with the purported aim of lengthening the maturity profile of investors. In November 2009, authorities in Korea imposed a set of tighter regulations on currency trading, including new standards for foreign exchange liquidity risk management, restrictions on currency forward transactions of non-financial companies, and mandatory minimum holdings of safe foreign currency assets by domestic banks. This set of policies followed an earlier move to curb speculative foreign exchange transactions. In July 2010, the minimum amount of deposits for foreign currency margin trade was raised to 5 percent of transaction value from 2 percent in an effort to clamp down on speculative foreign exchange trading by individual investors. A number of SEACEN countries, such as the Philippines and Thailand, have made it easier for domestic residents to invest abroad. Easy access to foreign investments has long been one prescribed measure to mitigate the impact of capital inflows on the domestic economy.

⁷ The Bank of Papua New Guinea has imposed prudential standard on limits on inter-bank placements.

Table 2: Selected Capital Account Prudential Measures

Country	Policy Measures
Malaysia	Raised overseas investment limit of the Employee Provident Fund (EPF) (October 2010).
Indonesia	Required one-month minimum holding period for Bank Indonesia Certificates (SBIs) of all maturities (July 2010).
Taiwan	Limit on foreign investors' investment on government bonds and money market products.
Thailand	-Raised the amount that foreign-currency exporters can hold abroad; relaxed foreign-currency limit on bank accounts in Thailand; relaxed regulation on resident investments abroad (properties and FDI) (October 2010). -Introduced a 15% withholding tax on interest income and capital gains on fixed income investment by non-residents (October 2010)
South Korea	Limited bank's foreign exchange forward positions; cut ceilings on companies' currency derivative trades and minimum holding period. Raised the cost of foreign currency margin trade.

Source: Official Websites of the Central Banks.

Going forward, a number of issues remain to be resolved. Should these macro-prudential policies be implemented on a transparent rule based approach? This is a familiar question and has long been debated for monetary and fiscal policies. For both fiscal and monetary policies, we have learned that the fixed rule and discretion approaches offer their own distinct advantages. It is likely that a combination of these approaches could maximise the effectiveness of macro-prudential regulations. The proponent of the rule-based system claims that this approach aligns the expectations of market and policy makers so that policy is transmitted quickly and effectively to the economy. However, if any lesson can be drawn from the recent global financial crisis, it is that financial institutions have been very adept at gaming rule-based systems and that there are enough incentives for risky financial activities outside the perimeter of supervision and regulation (Yellen, 2010). Furthermore, financial institutions and their activities will evolve in ways that may limit the ability of the rule-based system to address all emerging systemic threats. Hence, a certain degree of discretionary measures to a generally rule-based approach are potentially warranted here.

Another consideration relates to the need for extensive international cooperation in designing and implementing these macro-prudential measures. A rising concern now is with rule arbitrage. If one country were to go it alone with tough and comprehensive measures, it is likely that we would see financial institutions fleeing the country to another with softer policy stances and hence, the importance of international commitment and cooperation to develop and implement coherent and comprehensive approaches. Lastly, to what extent should monetary policy be coordinated with macro-prudential regulation, especially with macro-prudential supervision? This issue remains a contentious one around the globe. Macro-prudential measures will undoubtedly have macroeconomic spillovers. Therefore, authorities must strive to ensure that monetary policies and macro-prudential regulations, including supervisory ones, work in a coherent manner. Hence, should these monetary and macro-prudential regulations and supervisory policies be closely integrated and assigned to the central bank? We will return to these two pertinent issues in the latter part of the paper.

3.2 Stress Testing: An Effective Approach?

3.2.1 *Why Stress Testing*

There is generally no consensus of a standard definition of financial stability (Bank Indonesia) nor is there any easy way to define it (Foot (2003)) or how best to model and analyse it (Andersen (2008)). It is arguably easier to define instability than financial stability (Ferguson, Jr. (2003)). Having done an extensive literature review, Schinasi (2004) defines possible ranges of financial stability as:

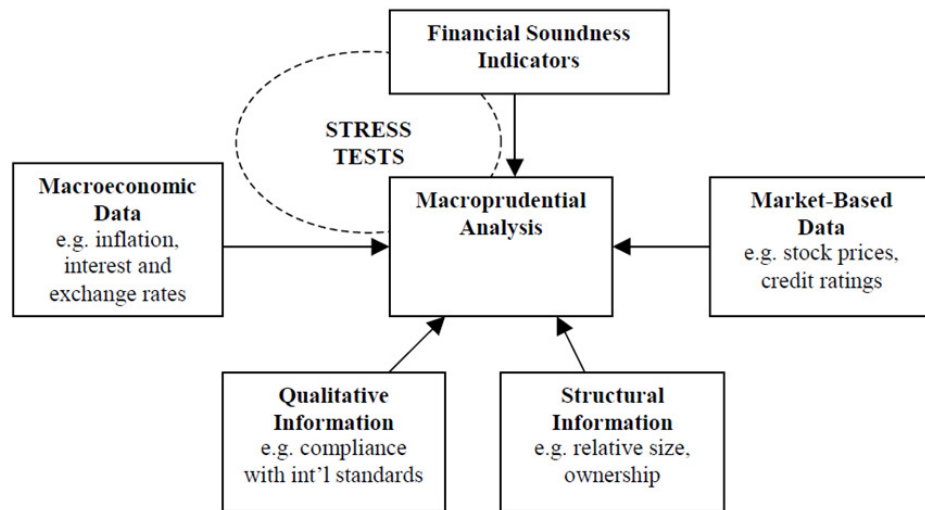
1. A financial system is entering a range of instability whenever it is threatening to impede the performance of an economy.
2. A financial system is in a range of instability when it is impeding performance and threatening to continue to do so.

From the many definitions, it is obvious that financial stability is neither in a state of equilibrium nor is it ever static. It may continue to evolve, moving along a continuum and is consistent with what is known as “a perpetual state of flux and transformation” (Schinasi (2004, p.8)). Given this situation, it is important for supervisors to decide whether the financial system is potentially entering or is already in a range of instability.

In the past, the main focus has largely been to strengthen and develop further key financial stability indicators. While these indicators are useful, there is one critical shortcoming. These indicators are static and only capture the present conditions of the financial institutions’ balance sheets. On the other hand, the basic idea of stress testing is based on the macro-financial linkages (Figure 10) where the state of the “financial system is inextricably intertwined with the performance of the economy and its resilience to shocks” (Trichet (2005)). Stress testing (ST) examines financial institutions’ balance sheet indicators corresponding to exceptional but plausible events in the near future.⁸ As a forward looking instrument/tool, ST not only adopts the same set of financial stability indicators, but also focuses on the present/contemporaneous stage - the balance sheets of the financial institutions exposed to various possible financial and economic shocks, domestically and externally. The ST results would provide a range of financial indicators associated with those future different plausible shocks.

⁸ ST which allows macroprudential supervisory perspective to be married with the insight gained from microprudential supervision on firm-specific information to analyse systemic risks and emerging stress has now been accepted as one of the most integral components of the macro-prudential tools in recent years (Tarullo (2010)).

Figure 10: Framework for Macroprudential Analysis



Source: Sundararajan & et. Al. (2002).

In general, there are at least six ways to stress test a financial institution (BIS 2000).⁹ These are:

1. Sensitivity test in which the impact of the portfolio of the financial institutions is determined following a predefined change in a particular market risk;
2. Scenario analysis in which risk factors may change due to foreseeable (plausible) future events;¹⁰
3. Maximum loss approach, in which a scenario is conceived based on the worst possible scenario;
4. Extreme value theory (EVT) in which the occurrence of extraordinary event(s) is conceived;¹¹

⁹ ST can be divided into “piecewise” approach where vulnerability is evaluated based on a single risk factors or an integrated approach where multiple risk factors are involved (Sorge (2004)). Early versions of ST were based solely on the micro-prudential approach where the only concern was the assessment of individual institutions. More sophisticated models have appeared in recent years to access and monitor the strengths and vulnerabilities of the overall financial system as well. In this respect, ST has come to be known as macro-prudential stress test. Crockett (2000, p. 29) defines the objective of macro-prudential as “limiting the likelihood of the failure, and corresponding costs, of significant portions of the financial system. This is often loosely referred to as limiting systemic risk”.

¹⁰ One method is to basically replicate historical episodes of stress, such as Black Monday in 1987, 1997 East Asian crisis and the 9/11 terrorist attack.

¹¹ EVT is notable for being the only stress test technique that attempts to attach a probability to stress test results (BIS (2000)).

5. Contagion analysis to take into account the transmission of shocks from individual financial institution's exposures to the financial system as a whole (Čihák (2004));¹²
6. Reverse stress testing, in which the scenario is of a total bank collapse (render the business model unviable) and the financial institutions undergoing the stress test are required to work backwards to determine risks and vulnerabilities and to identify circumstances where this might occur. This, in effect, is completely different from the original stress test methodologies (1-5 above) where the outcomes are the results of changing circumstances (FSA (2010)).

ST can be carried out via two approaches (Table 3). The first one is known as top-down approach, and the second one is the bottom-up approach. The top-down approach is conducted by the supervisor of the banking sector. Given the available data supplied by the member banks to the supervisor, different stress-test scenarios to measure credit risk exposures, in particular, of individual banks and the overall banking system can be performed. Since it is executed and designed by a single institution (the supervisor of the banking sector for instance), the results of each bank are comparable. Furthermore, given the availability of data, this approach should be able to capture potential contagion effects.

Table 3: Summaries of Top-Down versus Bottom-Up Approaches

	Top-Down Approach	Bottom-Up Approach
Conducted by	Central bank or supervisory agency developing the tools	Individual bank developing their own tools or using their internal model
Data	Using aggregate data of each bank or banking system available at the central bank	Using sub-portfolio/portfolio-level data or customer data of its individual bank
Impact Analysis	Assessing the impact of stress scenario on individual bank and banking system's portfolio quality and capital position	Assessing the impact of stress scenario on financial statements of each customer, then aggregating the impacts to find overall impacts on each bank's portfolio and capital position
Pros	It is effective in examining credit risk. Stress test results can be compared across banks. It covers broader perspectives, including feedback effects from the financial system to the macro-economy, and contagion.	Due to its tailor-made and richer data sets, this can better reflect the market and liquidity risk profiles of each bank's portfolio.
Cons	Results may not reflect each bank's risk profile well.	With different methodologies used by each bank, it is difficult to compare the results across banks.

Source: Subhaswadikul (2010) and Zhu (2010).

¹² The contagion effect where the inter-linkages of inter-bank exposures is explicitly taken into account allows the stress testing to evaluate the importance of individual shocks over the entire financial systems and this provides a more realistic account of possible domino effects (Sorge (2004)). The so-called "dynamic" effect is based on an iterative approach which may allow factors such as the interaction for management decisions, asset sales and liquidity hoarding (e.g., endogenous risk created between the interaction among credit, market and liquidity risk) (Haldane (2009)).

On the other hand, bottom-up stress-testing is carried out by the individual banks, where scenarios are pre-defined by the supervisory authority. The advantage of this approach is the richer data sets and more comprehensive understanding of market and liquidity risks of banks. Comparing the outcomes of the bottom-up approach, however, can be an arduous task. In the bottom-up approach, each bank has the latitude to select its own methodologies and to apply their own unique databases. Kishan and Opeila (2000) demonstrated that loan supplies of poorly capitalised banks reacted more sensitively compared to well-capitalised peers. If the financial stability of individual banks differs, the monetary transmission of monetary policy is likely to be adversely affected (De Graeve & et.al. (2008)). Furthermore, this approach, due to the data limitation on the overall banking system and its focus on individual banks, will not be able to comprehensively capture the contagion effect and the macro-financial feedback effects. Therefore, the standard practice would be to perform both top-down and bottom-up approaches.

Under Basel II, stress-testing is an integral part of both Pillar 1 and Pillar 2.

1. Under Pillar 1 on minimum capital requirement, stress-testing is a vital instrument to assess credit risk, market risk and operational risk. Furthermore, the Pillar 1 framework requires banks to use the Internal Models Approach to determine the market risk capital to have in place a rigorous programme of stress testing. Similarly, banks using the advanced and foundation internal ratings-based (IRB) approaches for credit risk are required to conduct credit risk stress tests to assess the robustness of their internal capital assessments and the capital cushions above the regulatory minimum.
2. Under Pillar II on Supervisory Review Process, stress-testing is required to measure interest rate risk, credit concentration risk (potential over-exposures to a specific class of asset, borrower, industry or region), and counter-party credit risk.

Thomas and et.al (2009) note that under the the current regulatory framework of the Basel Committee on Banking Supervision (2005), stress testing must meet three requirements: plausibility of stress scenarios, severity of stress scenarios, and suggestiveness of risk-reducing actions. However, in practice, there are several obvious limitations of a stress test. A typical stress test does not present the probability of an event occurring (rather it estimates the exposure of it to specific events) (BIS (2000)). Many advanced ST models now include feedback mechanism between the financial and real sector. However, in practice, due to data limitation and cost in data collection, these feedbacks are often ignored or foregone.¹³ Using ex-post information on stress testing and financial crises, Alfaro and Drehmann (2009) find that often stress scenarios are just not severe enough, especially when these crises are not superseded by weak macroeconomic conditions. They suggest that scenario assumptions should be severe enough but “ex-ante are not beyond the realm of possibility” (Alfaro & Drehmann (2009), p.30)). Recently, Thomas and et.al (2009) propose a methodology to identify a region of plausibility in terms of risk-factor distribution and calculate a precise trade-off

¹³ Haldane (2009) also notes that so far, not many attempts have been made to incorporate a comprehensive dynamic approach to stress testing.

between plausibility and severity. In this way, only harmful but plausible scenarios are captured, giving credibility to the stress test. Even then, Alfaro and Drehmann (2009, p.39) find that many stress testing models do not perform very well before and during crises as many of these models (even with feedback mechanism) fail to capture extraordinary “crisis dynamics” such as bank runs, interbank market freezes and credit rationing. At present, most stress testing methodologies do not cover certain risks in sufficient detail.¹⁴ These include (BIS (2009)): (1) behaviour of complex structured products under stressed liquidity conditions; (2) basis risk in relation to hedging strategies; (3) pipeline or securitisation risk; (4) contingent risks; and (5) funding liquidity risk. Therefore, even with ST results, it may be difficult to suggest effective risk-reducing actions.

3.2.2 Specific Issues and Challenges: Experiences of Asia

The efforts of conducting stress testing on a regular basis have gained momentum during the last few years, largely attributable to the recent sub-prime crisis. However, in many developing economies, including those in Asia, stress testing is still at its infancy. Major East and Southeast Asian economies, such as Indonesia, Malaysia, the Philippines, Taiwan, Thailand, Singapore and Hong Kong had all started with various sensitivity tests immediately after the 1997 financial crisis. For example, since the 1997 Asian crisis, some Asian countries have started conducting macro-prudential surveillance (Financial Sector Assessment Programs (FSAPs) with macro stress testing as an essential component) of their financial systems jointly with the International Monetary Fund and the World Bank. At the early stages of implementation, the stress-testing for these countries was done externally by the IMF team. However, since late 2006, the central banks and monetary authorities have begun to implement basic modifications of the FSAP model. The case of Thailand is summarised in Table 4, representing the general process taking place in Indonesia, Malaysia and the Philippines.

¹⁴ In recent years, risk monitoring of financial institutions is getting more difficult due to the growing complexity and diversification of these institutions (BIS (2000)).

Table 4: Bank of Thailand's Milestones on Stress-Testing

2007: <ul style="list-style-type: none"> Participated in the stress-testing component of the Financial Sector Assessment Program (FSAP), a joint undertaking by the IMF and the World Bank. Developed Macroeconomic Credit Risk Model to be used in top-down assessment of macro-credit scenarios
2008: <ul style="list-style-type: none"> Issued supervisory scenarios, including sub-prime crises; various macro-credit scenario, market and liquidity scenario to commercial banks. These banks were expected to assess impacts via bottom-up approach.
2009: <ul style="list-style-type: none"> Required foreign bank branches in Thailand to perform liquidity stress testing in second half of 2009. Issued Pillar 2 guidelines which include stress-testing in the second half of 2009.
2010: <ul style="list-style-type: none"> Developed examination guidelines for credit risk, market risk and interest rate risk in banking book and liquidity stress testing. On-going development of sectoral credit risk models, namely, corporate model, personal loan model, real estate loan model and housing loan model.

Source: Subhaswadikul (2010)

It is worth highlighting that prior to 2007, the sensitive stress testing technique was predominantly employed. Only in 2008 and 2009 was different scenario testing explored to test various risks such as credit, liquidity and market risks by the central banks and monetary authorities in East and Southeast Asia. For credit risk, a number of scenario shocks are similarly shared in these countries (Table 5).¹⁵

Table 5: Selected Macroeconomic Scenarios Considered for Credit Risk Stress Testing

Countries	Scenarios
Indonesia	(1) . A shift in credit collectability to lower level by 20 percent each; (2). A rise in the interest rate by 100 bps; (3). Rupiah depreciation by 20 percent from the foreign exchange maturity profile of less than three months; (4). Price of government bond drop by 20 percent; and (5) Drops in real domestic GDP growth rate.
Malaysia	Macroeconomic parameters that are comparable to historical worst levels such as the 1997 East Asian financial crisis, the 2001 dot-com bubble and the 2003 SARS outbreak. External factors such as prolonged slowdowns of global and regional economies.
Philippines	Ranges for baseline and stress scenario via: (1). Domestic GDP growth rate; (2). Interest rate; (3). Inflation rate; (4). Remittance growth rate; (5). Exchange rate (against the US dollar).

¹⁵ The implementation of foundation internal rating base (IRB) for examining credit risk in major economies in Asia and Pacific, in general, is still in a very early stage. For most parts, the Standardized Approach has been implemented, but the datelines to push for foundation IRB and advanced IRB vary from 2008 to 2010 for most countries, with the exception of India which is 2012-2014.

Thailand	Ranges for baseline and stress scenario via: (1). Domestic Growth rates of GDP and its various components; (2). Interest rate; (3). Inflation rate (core and headline); (4). Exchange rate (against the US dollar); (5). Crude oil price; (6). Trading partner GDP growth rates.
Singapore	Various Macroeconomic shocks; Shocks to global economy; Dividend payouts and earning projections over stress horizon.
Hong Kong	Ranges for baseline and stress scenario via: (1). Domestic GDP growth rate; (2) GDP growth rate of main-land China; (3). Interest rate; and (4). Property price.
Taiwan	(1). Fall in revenues of corporate borrowers; (2) Decline in real income of household borrowers; and (3) Decline in real-estate collateral.

Source: Financial Stability Reports of the Central Banks and Monetary Authorities (various years) and SEACEN Survey, Oct 2010.

Moving forward, there are several immediate challenges for the overall improvement of stress-testing by the Asian central banks and commercial banks, particularly in the emerging markets. First is data and model limitation.¹⁶ In Asia, the models are still relatively simplistic, mostly in the form of linear model equations, which may be suitable for examining risk exposures during normal economic conditions, but not during a crisis. Furthermore, these models, quite apart from models being applied in developed economies, have not incorporated even the basic feedback mechanism to take into account the second-round effects and the critical systemic effects. Furthermore, different risks are still frequently being treated and evaluated separately. Not surprisingly, the data and model limitations are the fundamental weaknesses in infrastructure and have been found to limit the ability of banks to identify and aggregate exposures across the wider financial system (BIS (2009)).¹⁷ It is also noted that the lack of high frequency and long time-series data at disaggregated levels prevent efforts to expand scenarios that can be tested, and therefore the comprehensiveness of the analyses that can be generated.

Another critical shortcoming with the implementation of the stress-testing efforts among the commercial banks in Asian emerging markets has been the lack of appreciation and commitment of commercial banks' senior management. This weakness, however, is wide spread globally and not unique to Asia only. BIS (2009) notes that stress testing is often done with little interaction with the management as they often believe that the analysis is not credible. It is often the case that the commercial banks carry out internal stress testing mainly to comply with the requests of the supervisory authority. In July 2008, the Final Report of the IIF Committee on Market Best Practices: *Principles of Conduct and Best Practice Recommendations* published by the International Finance underscored that for ST to have a meaningful

¹⁶ For stress testing to be successful, central banks may need a suite-of-models to make use of all relevant data. E.g., at Norges Bank where the suite-of-models approach is employed to take advantage of several data sets. The stress testing models consist of a small macro model and micro data models for companies, households and banks (Andersen (2008)).

¹⁷ It is recognised, however, that the complexity and the sophistication of the models do not necessarily guarantee the comprehensiveness of the results.

impact on business decisions, the board and senior management ought to play an active role in evaluating stress test results and their impact on the bank's risk profile.

By the same token, for the ST to be a credible one, the monetary authorities must ensure transparency of the whole process. An important aspect of stress testing for consideration is the disclosure of results.¹⁸ Stress testing results may be disclosed to the public in three ways (Tarullo (2010)). Firstly is by full disclosure of the release of detailed formation about the methodology and banks' specific outcome. Secondly is through the release of detailed information but without specific results of individual banks. This is towards a more systemic approach and thirdly, the release of aggregate results with forward looking assessments of the overall financial system.

How far would the central banks publically disclose the process and the outcome of stress-testing? Would the Asian central banks/bank regulators go as far as publishing the test results for each individual bank (as in the case of the Supervisory Capital Assessment Program (SCAP) in the United States during the first quarter 2009) or would they just release the aggregate results of the test – without revealing how individual banks fared (as in the case of the European Union (EU) bank stress testing results in 2009)? Definitely, encouraging financial institutions to disclose and publish stress testing results can help to improve financial market understanding (Haldenc 2009). However, it is also important to realise that over disclosure may be damaging, especially for economies that are heavily reliant on the role of banks as financial intermediaries (e.g., in Europe and Asia versus the US) (Nagy 2009). Due to its complexity, industry practitioners caution against the risk of misinterpretation of stress test results by the public (Polleit, quoted in The Local (2010)). Ackerman, the CEO of Deutsche Bank AG also argues that if the support mechanisms are not made explicit beforehand, making stress tests public would be “very, very dangerous” as it could lead to greater uncertainty and could even potentially destabilise markets (Ackerman, quoted in Kirchfeld and Clark (2010)). Having said that, Nagy (2009) points out that past experiences have demonstrated that market reaction to stress test results has been positive. In the same vein, Tarullo (2010) also argues that the more frequent the release of the stress test results, the better for the market as frequent detailed disclosure can result in less unpleasant major surprises.

Table 6 reveals some of the features of participation, frequency and dissemination process of stress testing among selected SEACEN economies. As expected, there is a range of stress testing practices being implemented in these countries. To ensure comprehensiveness of the testing, at least 60 percent, and as much as 100 percent, of the commercial banks are required to participate. Thailand and Taiwan carry out the testing on an annual basis, while others have chosen to push for a more frequent examination (quarterly and monthly). Based on the survey conducted by The SEACEN Centre, a fair share of the SEACEN central banks still have no plans to publically disseminate the results of the testing. Bank Indonesia and Bank Negara Malaysia partially disclose the aggregate results via their Financial Stability Review reports.

¹⁸ To restore confidence in European banks, the European Union leaders agreed in June 2010 to publish the results of the bank stress tests in July 2010.

Table 6: Participation, Frequency and Dissemination of Stress Testing

Country	Number of Institutions Participated	Frequency	Public Dissemination of Results
Indonesia	100%	Monthly for credit, market and liquidity risk. Quarterly for macro-risk analysis.	Partial disclosure (no name of institution) via Financial Stability Review report
Malaysia	100% of financial institutions under the supervision of BNM.	Quarterly by financial institutions and semi-annually by Bank Negara Malaysia.	Partial disclosure (no name of institution) via Financial Stability Review report
Philippines	Top 10 (out of 38) Universal and Commercial Banks ---around 62% of the Philippines Banking System in March 2010	Quarterly	Partial disclosure (no name of institution) via Financial Stability Review report
Thailand	100% of local bank, covering of 80% of total portfolio of each bank.	Annually	No
Singapore	20% of total banks (or more than 65% of the total banking system)	At least annually	No
Taiwan	92% of domestic bank, covering 98% of total domestic bank asset.	Annually	No

Source: Financial Stability Reports of the Central Banks and Monetary Authorities (various years) and SEACEN Survey Oct 2010.

3.2.3 Greater involvement of Bank Supervisors in Stress Testing

In summary, stress testing allows benchmarking across financial institutions (Haldanc 2009)) as it provides a coherent and consistent framework for assessing systemic risks and is a potential starting point for assessing potential financial stability threats (Bunn & et.al, (2005)). It can also provide forward-looking assessments of risk and information on the setting of a banks' risk tolerance (BIS (2009)), compelling bankers to mull over the consequences of the risks certain plausible events can bring about (Bernanke (2010)). In addition, it can serve as a communication tool (Hosoya & Shimizu, 2002) supporting internal and external communication (BIS (2009)), for e.g., creating public and management awareness (BIS (2009), Alfaro & Drehmann (2009)) while at the same time providing transparency to regulators and financial markets, feeding into firms' liquidity and capital planning ((Haldanc (2009)).

There is little doubt that despite the limitation, even basic stress tests can provide supervisors with some kind of indicators for the identification of vulnerabilities, risks and weaknesses of the supervised entities. Having said that, it is important for supervisors to recognise the limitation of stress testing modelling, particularly when feedback effects are not explicitly modelled. In particular, supervisors

need to encourage greater participation by management of supervised entities to identify systemic vulnerabilities. On their part, supervisors must also be prepared to provide clear policy guidelines related to stress testing results such as follow-up measures to address the outcomes of the stress-testing, adjustment in capital adequacy positions and other possible regulatory actions.

A comprehensive analysis of stress testing results may require systems thinking beyond national borders by taking into account international linkages and dynamics. As the recent case of structured credit and credit derivatives markets shows, the scale of cross-border banking is becoming increasingly large and this has the potential to transmit shocks from one country to another on a large scale. Currently, stress testing modeling has not reached that level of sophistication to take into account cross-border dynamics.¹⁹ However, supervisors can share vital cross-border information regarding their domestic financial situation. Various aspects pertaining to cross-border banking issues will be discussed next.

3.3 Coordinating Supervision at National Borders and Beyond

3.3.1 Supervision at National Borders

Following the 1997 Asian financial crisis, there was and still is much debate on the need to enhance supervisory capacities of financial institutions. New developments in the banking industries imply that they are not only confined to the traditional business of lending and providing avenues for deposits but are also actively expanding their ambit into investments and even insurance services. Naturally, this calls for a more integrated domestic financial supervisory system to keep up with the advancement of the banking sector (Siregar & James (2006)).

There is a wide range of supervisory models being practiced today, ranging from a fully integrated model with complete supervisory functions in all sub sectors to the “twin peaks” model (where one agency is responsible for prudential supervision and the other for business conduct supervision) and no sectoral integration (where various supervisory bodies are independently responsible for their own sector(s)) (Čihák & Podpiera (2008)). The statutory supervisory functions could either reside fully or partially within the central banks. As such, potential conflicts and inconsistencies could arise either:

1. Between the objectives of prudential and monetary policies, even when both functions are within the realm of the same organisation (i.e., central banks); and,
2. Between the objectives of different supervisory agencies.

The conflict of objectives between monetary and prudential policies is obvious in some circumstances. One example is in the area of the lender-of-last resort function and bail-out facilities. Bail-out exercises during the 1997 East Asian financial crisis

¹⁹ A promising approach is the Agent-based Modelling where agents’ behaviour is explicitly modeled to include direct interaction among themselves. For instance, the feedback mechanisms can amplify small effects, such as “bank runs” into significant events, i.e., these ‘non-linear effects’ are not proportional to their causes (The Economist (2010)).

(prudential policy to prevent systemic risks) resulted in sudden severe increases in the inflation rate (monetary policy) and meltdown of local currencies, particularly in Indonesia. Another possible area of interest is central banks' (monetary policy) support for small and medium enterprises. Looking from the prudential point of view, it is uncertain whether this type of support will lead to potential losses. In the area of intermediating large capital flows, prudential measures must be in place to strengthen credit and other risk management capabilities of individual banks while monetary policy must be able to limit excessive credit expansion (Lindgren (2007)).²⁰

Obviously, if there are various supervisory agencies, the challenge is how to ensure close coordination among them for policy consistency. For example, in the 1980s, the US thrift industry experienced massive losses partly because the housing industry was heavily promoted by the industry's prudential supervisor, the Federal Home Loan Board. Similar experiences were evidenced in the US between the US Securities and Exchange Commission (SEC) and the Federal Reserve Bank (Wall (2009)). The (SEC), which is responsible for setting accounting policies to assist investors to make informed decisions, believes that reported net income in each period should fairly reflect the results of the firm's operation for that period. The Federal Reserve Bank regulatory agencies, on the other hand, which are responsible for the prudential supervision of commercial banks, desire banks to build up loan loss reserves during good periods to cover losses that are likely to be incurred during weaker economic conditions. These two conflicting intentions could easily lead to inconsistent policies of reporting.²¹

Concern over coordination failure led to an intensive discussion on another approach of an independent integrated financial supervisory agency immediately after 1997 crisis. However, the recent global financial crisis demonstrated that the existence of an independent integrated financial supervisory agency does not necessarily guarantee timely and improved coordination between the relevant institutions. Following the subprime crisis in 2007, Northern Rock (NR), a medium-sized bank, suffered a bank run, the first such run on a British bank in approximately 130 years. The NR episode opened up new debates on whether the Tripartite Arrangement is the right approach for achieving financial stability.²² These debates were centred on not only whether the same institution should be responsible for the overall systemic financial

²⁰ In this way, both set of policies work hand-in-hand to enhance asset quality and bank soundness.

²¹ A number US banks, including Sun Trust -- a large regional bank in the US, were caught between the two regulators (Wall (2009)). The US Congress eventually had to step in and mediate the policy conflicts between these two key regulatory agencies.

²² The UK supervisory structure for financial stability is the Tripartite Arrangement which consists of the Bank of England (BoE), the Financial Stability Authority (FSA) and the Treasury. To ensure the smooth running of the Tripartite, a Memorandum of Understanding (MOU) was signed in 1997 and subsequently updated in 2006 between the three parties. Following the MOUs, in terms of financial stability, it is clear that the task of the BoE is to maintain the stability of the financial system as a whole while the FSA's powers and responsibilities include the prudential supervision of financial markets and institutions. Meanwhile, the Treasury is responsible for the overall institutional structure of financial regulation and the legislation which governs it. Accountability, transparency, avoidance of duplication and ensuring regular information exchange were explicitly stated in these MoUs. In the event of a crisis unfolding, the Tripartite Agreements implies that FSA has to decide whether an appealing bank for help is solvent, the BoE will decide whether the failure of that bank is systemic and because tax-payers' money is involved, the Treasury, acting on the advice of the BoE and the FSA, will make a decision whether to authorise support (Hall (2008)).

stability as well as the power to supervise individual institutions but also whether a central bank, having no statutory power over prudential regulation and supervision of individual institutions, can effectively act as a lender-of-last-resort (LLR) (Llewellyn (2009)). In the case of NR, the FSA's view was that it had wanted the BoE to intervene earlier but that the central bank had different views regarding moral hazard problems (Llewellyn 2008). It took over a month for the BoE to finally announce its support for NR (Kashyap (2010)). However, in all fairness, lacking coordination and information sharing, the BoE was unaware of the severity of the problems until much later (Ponce (2010)). In this respect, as has longed argued by the Bank of Japan, unless it has information on financial conditions, the central bank cannot effectively act as the LLR (Llewellyn (2008)). It has also strongly argued that the Tripartite Arrangement is "risky" and an "invitation to disaster, to delay, and to wrong decisions."²³ The FSA is expected to be disbanded by 2012 with the power of supervision transferred back to BoE.

In the SEACEN region, as the supervisory model is mostly partially integrated (where various agencies (central banks/monetary authorities included) are responsible for supervising the different subsectors of the financial industry), there are various ways to enhance supervisory effectiveness. In Malaysia, the new 2009 Central Bank Act (CBA) empowers Bank Negara Malaysia with a greater consolidated supervisory mandate. Provisions under this new Act range from providing the central bank with authority to institute cooperation arrangements and allowing the central bank to make explicit recommendations to other supervisory agencies with regard to financial stability. This Act also provides the central bank with power to solicit relevant information for the purpose of financial stability from both banks and non-banks, and to issue reprimand orders to any person in the interest of financial stability.

Another way of enhancing cooperation is by setting up a common forum. For instance, in countries such as the Philippines and Indonesia, the Financial Sector Forum (FSF) was formed in 2004 and 2005 respectively to push for greater coordination among supervisory agencies of financial institutions. Among the functions of the FSF (which normally include the central banks and other agencies such as the securities commission and the insurance deposit guarantee cooperation. In Indonesia, the Ministry of Finance is also a member) are to coordinate and exchange information and to harmonise the implementation of specific initiatives in the financial sector (Bank Indonesia). However, FSFs are usually cooperative efforts without any legal mandate and do not form an integrated supervisory body (Espenilla (2007)).

In other SEACEN countries such as Korea and Taiwan, where the statutory financial supervisory function is not with the central banks, there are also similar efforts to close potential inconsistency gaps through cooperation. For example, the Bank of Korea conducts regular examinations of financial institutions with the Financial Supervisory Service (FSS), an independent integrated financial supervisory institution, while in Taiwan, the Financial Supervision Coordination Group (FSCG) which comprises

²³ Another obvious flaw in the NR fiasco is the deposit insurance structure. The first £2,000 of deposits is fully guaranteed. However, the guarantee is limited to 90% of deposits of up to the next £33,000. This low level, together with uncertainty as to when and how depositors will be able to get their money back led to a loss of confidence in the system (Keasey & Veronesi (2008)). The level of deposit guarantee was almost the lowest in industrial countries (Llewellyn (2008)).

among others, senior officers of the Central Bank, Chinese Taipei and the supervisory agency, meets every month and when necessary to coordinate and cooperate on issues of financial supervision, management and examination. Meanwhile, the Central Bank Act of Bank Indonesia, introduced as far back in 1999, calls for Bank Indonesia and the Ministry of Finance to set up an independent financial supervisory institution to fully integrate the supervision of banks, securities and insurance companies within a single institution, which is expected to be established by the end of 2010.

3.3.2 Cross-Border Supervision

The importance of supervisory cooperation has again come to the forefront in the recent sub-prime crisis, albeit with a different inflection. This time around, the issue is on cross-border supervision --why it has not progressed to what it should be, to deal with the scope and complexity of financial development (BIS (2009)). Cross border banking with the presence of multinational banks (includes the newly emerging regional multinational banks) enhances the 'interconnectedness' factor. It is now a well known fact that globalised banks play a crucial role in the international transmission of monetary policies and economic shocks globally. At the first instance, the lack of cross border supervisory cooperation has resulted in asymmetric information on cross-border risk exposures leading to an under-appreciation by supervisors and regulators of underlying systemic risks and connections (Kodres & Narain (2009)). In addition, it is rather obvious that the existence of asymmetric information among supervisors in different jurisdictions, leads to untimely and uncoordinated responses (Nijathaworn (2010)). Furthermore, adequate cross-country supervisory cooperation and coordination are necessary to overcome loopholes such as currency substitution, or switching from domestic lending in foreign currency to direct foreign credit.

There are a number of challenges with regard to cross-border supervision. These are mainly centred on how to optimise informational exchanges and include the following:

1. Sharing and disclosure of vital information on financial institutions are often difficult as supervisors in different jurisdictions face different legal and constitutional constraints. In addition, conflicting supervisory assessments are also expected due to the vast diversity in the operational structures of banking groups in different countries (Roldán (2005)).²⁴
2. Given the sensitivity of the information that are required for sharing and dissemination (such as stress tests results and risk assessments on the cross-border institutions (Saccomanni (2009)), supervisors may need to weigh and balance the issues pertaining to national interests such as stability and efficiency of the domestic financial system. In some circumstances, when problems are beginning to surface, there may be a divergence of interest where the home or host supervisor seek to ring-fence problems at the national level and hence, impede the early detection of emerging group-wide

²⁴ For instance, recent developments in the financial sector have blurred the distinction between branches and subsidiaries in banking groups. For the sake of efficiency, banks have organised their structures along business lines rather than on legal and national lines (Ingves (2007)). Also, in the electronic age, it is now possible to manage these branches and subsidiaries on an integrated basis from the home country (Eisenbeis & Kaufman (2008)).

cross border problems. Even during a crisis, in defending national interests, national supervisors may not be willing to disclose information on vulnerabilities of financial institutions they supervise (de Larosière Group (2009)). Therefore, building trust among supervisors over time in different countries is very crucial. (Holthausen & Rønde (2005)). It is also vital to share “softer” information such as informal information on borrowers, etc. (Holthausen & Rønde (2005), Zeti (2005)).

3. The home and host countries issue may also arise due to the importance of the relevant financial institution. For instance, a global financial institution may be deemed systemic and significant for the host supervisor of country A. Yet, for the home supervisor, the presence of its global financial institution in country A is only an insignificant share of the financial institution’s global activities. As such, one may apply *the principle of proportionality* (PP) (Trichet (2007)). The PP ensures efficiency and effectiveness as the supervisory relationship is structured in such a way that a more prominent role is given to supervisors where the targeted group entities figure prominently in the jurisdictions (e.g., in terms of the asset size). In this way, Trichet (2007) argues that potential incentive problems can be reduced.
4. There is also the question as to what extent such information sharing arrangements and cross-border supervision should be legalised. Pan (2010)). For example, it has been postulated that the lack of an international legal regime capable of conducting prudential supervision of cross-border financial institutions is the reason for the sub-prime crisis. Ingves (2007) also calls for the creation of a common regional/international body with a clear mandate to enable supervisors to effectively monitor and supervise cross-border banking groups. In addition, it is argued that the adoption of fully harmonised rules for a consistent supervisory framework will ensure efficiency in the decision making process.(EFS (2009)). However, others such as Trichet (2007), believe supervisors in different jurisdictions would have difficulties adjusting to a common framework given the various stages of development of *supervisory techniques*. This is well illustrated by the experience of the EU where it is rather difficult to transpose homogenous principles into national regulations (Hardy & Nieto (2008)). Regardless of the legal mandate, for cross-border supervision to be effective, a strong lead is necessary for coordinating and planning supervisory activities (Deutsche Bank (2008)).²⁵
5. Further to cross-border supervision is cross-border crisis management (e.g., the issuance of risk warnings) and resolution. Similarly, informational sharing is important to plan for orderly resolutions. A coordinated approach is needed to ensure that there is no ring-fencing in favour of national interest or to sidestep different preferences for crisis resolution outcomes (BIS (2009)) and agency problems (Eisenbeis & Kaufman (2008)).

One potentially effective method to facilitate cross-border policy cooperation and coordination is through the college of supervisors.²⁶ The college of supervisors is

²⁵ Legally, it may be difficult to empower the lead supervisor with the necessary authority as often as deemed “politically unfeasible”(Véron2008)).

²⁶ As of September 2009, there are more than 30 colleges to supervise complex institutions.

defined as a “permanent, although flexible, structure for cooperation and coordination among the authorities of different jurisdictions responsible for and involved in the supervision of the different components of cross-border banking groups, specifically large group” (The Committee of European Banking Supervisors (CEBS (2009)). As a general rule, the establishment of a supervisory college should be considered for significant financial institutions in terms of size, interconnectedness with other components of the financial system and/or the roles they play in the market which may cause systemic impact on the country’s financial system, hence affecting the region’s financial stability.

As of May 2010, a number of major central banks in Asia have been invited to participate in colleges of supervisors. Bank Negara Malaysia, for instance, is involved in the colleges of supervisors organised by the Financial Stability Agency of United Kingdom for the Standard Chartered Group, the BaFIN for the Deutsche Bank Group and the OFSI for the Bank of Nova Scotia Group. Similarly, the Monetary Authority of Singapore (MAS) and Bangko Sentral ng Pilipinas have also participated in a number of colleges of supervisors set up for major European and the US banks. However, as of late 2010, there has not been any arrangement for supervisory colleges for Asian regional multinational banks such as Malaysian and Singaporean banks discussed earlier.

A recent survey carried out by The SEACEN Centre has identified a number of regional and global banks that have strong presence in major Asian economies (Siregar and Lim (2010). The Hong Kong Shanghai Banking Corporation (HSBC), Citibank and the Standard Chartered Bank are among the three major international banks that have wide and extensive branch networks in the Asian region (Table 7). In addition to these three international powerhouses, the region has also witnessed the emergence of its own multinational banks. In Malaysia, banks such as the Malayan Banking Berhad (Maybank), Commerce International Merchant Bankers Berhad (CIMB) and Rashid Hussain Berhad (RHB) have expanded their networks beyond Southeast Asian countries. A number of Singaporean banks, namely the Development Bank of Singapore (DBS), the United Overseas Bank (UOB), and the Overseas Chinese Bank Corporation (OCBC) have achieved similar success in their efforts to become regional banks.

Table 7: Cross Border Banks in SEACEN Countries

Central Banks/Monetary Authorities	Top 3 domestic FIs in your jurisdiction that have significant presence in the region	Top 3 foreign FIs in your jurisdiction that are originated from SEACEN member countries	Top 3 other foreign FIs (apart from originating from SEACEN member countries) that have significant presence in your country
Ministry of Finance, Brunei Darussalam	The domestic banks have a presence only within the country	<ul style="list-style-type: none"> - Maybank (Malaysia) - UOB (Singapore) - RHB Bank Berhad (Malaysia) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard Chartered Bank
Bank Indonesia	<ul style="list-style-type: none"> - Bank Mandiri - Bank BRI - BCA 	<ul style="list-style-type: none"> - CIMB Niaga (Malaysia) - Bank International Indonesia (Maybank Malaysia controls around 43%) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard Chartered Bank
The Bank of Korea	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - DBS (Singapore) - UOB (Singapore) - OCBC (Singapore) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard Chartered Bank
Bank Negara Malaysia	<ul style="list-style-type: none"> - Maybank - CIMB Group - Public Bank 	<ul style="list-style-type: none"> - OCBC (Singapore) - UOB (Singapore) - Bangkok Bank (Thailand) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard Chartered Bank
Bank of Papua New Guinea	<ul style="list-style-type: none"> - Bank South Pacific 	<ul style="list-style-type: none"> - Maybank (Malaysia) 	<ul style="list-style-type: none"> - ANZ Bank (Australia) - Westpac Bank (Australia)
Bangko Sentral ng Pilipinas	<ul style="list-style-type: none"> - Metropolitan Bank Corporation (Metrobank) - Philippine National Bank (PNB) 	<ul style="list-style-type: none"> - Chinatrust (Taiwan) - Maybank (Malaysia) - Korea Exchange Bank (Korea) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard Chartered Bank
Monetary Authority of Singapore	<ul style="list-style-type: none"> - DBS Bank Limited - OCBC - UOB 	<ul style="list-style-type: none"> - Maybank (Malaysia) - Bangkok Bank (Thailand) - RHB Bank (Malaysia) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard Chartered Bank
Central Bank, Chinese Taipei	<ul style="list-style-type: none"> - Bank of Taiwan - Taiwan Cooperative Bank - Mega International Commercial Bank 	<ul style="list-style-type: none"> - DBS (Singapore) - OCBC (Singapore) - Bangkok Bank (Thailand) 	<ul style="list-style-type: none"> - Citibank - HSBC - Standard and Chartered Bank
Bank of Thailand	<ul style="list-style-type: none"> - Bangkok Bank - Kasikorn Bank - Siam Commercial Bank 	<ul style="list-style-type: none"> - UOB (Singapore) - CIMB Thai (Malaysia) - OCBC (Singapore) 	<ul style="list-style-type: none"> - GE Capital - ING - Standard Chartered

Source: Siregar and Lim (2010)

While supervisors cannot afford to exhibit country-centric focus (Eisenbeis & Kaufman (2008)), strong convergence in cross-border supervisory practices is not a prerequisite for effective cross-border supervision. However, there must be some degree of coordinated approach coupled with flexibility to enable adaptation of supervisory standards for domestic settings (G30 (2008), Nijathaworn (2010)). In other

words, it is important to recognise that cross-border supervision does not need a “single compliance process, but rather greater commonality in approaches and a process for further convergence where needed” (Roldán (2005)). In addition, it is important to recognise that in order to establish a more coordinated and streamlined process, transparency of these arrangements is very important, such as for example, prior understanding of the nature of the communication (CEBS (2007)) and technical issues (e.g., the definition of liquid assets are vastly different in SEACEN countries (Tientip (2010))). Some leeway must also be given to the type of information to be exchanged (Roldán (2005)).

4. Going Forward with the New Capital Standards under Basel III

Basel III represents a new era for global capital standards, emphasising on increasing both the quality and level of banks’ capital (Caruana 2010). Recognising the pro-cyclicality nature of banking activities and close connectivity of macroeconomic and financial sector conditions, the primary objective of the new capital standard is to enhance the quality and the level of banks’ capital. On September 2010, the Group of Governors and Heads of Supervision (the Basel Committee’s governing body), announced higher global minimum capital standards for commercial banks. This follows the agreement reached in July 2010 on the overall design of capital and liquidity reform package ---referred to as Basel III.

The Tier 1 minimum capital requirement which includes common equity and other qualifying financial instruments based on stricter criteria will be increased to 6 percent, compared to a minimum ratio of 4 percent under Basel II (Table 8). Under the new standard, a higher minimum capital requirement in terms of common equity is raised from 2 percent to 4.5 percent of risk-weighted assets. Furthermore, a broader and stricter definition of risk-weighted assets is imposed, particularly with the restrictive treatment of trading book, counterparty risk and securitisations. With the new tighter treatment, common equity minimum capital increased effectively from roughly 1 percent to 4.5 percent. Hence, the new capital requirement is expected to not only increase the level of capital adequacy, but also the quality of loss-absorbing capital.

Table 8: New Capital Framework

	Common equity	Tier 1 Capital	Total Capital
Minimum	4.5%	6.0%	8.0%
Conservation Buffer	2.5%		
Minimum + Conservation Buffer	7.0%	8.5%	10.5%
Countercyclical Capital Buffer	1-2.5%	0-2.5%	

Source: Danske Markets (2010)

To improve further the resilience of the banking sector, a 2.5 percent capital conservation buffer (CCB) is added on top of the 4.5 minimum capital requirement in the category of common equity, pushing the top-quality equity capital requirement to 7.0 percent compared to just 2 percent under the present Basel II standards. There is

also flexibility in the CCB as it can be drawn down in times of losses, thus mitigating procyclicality in times of stress for individual banks. The CCB has a macro-prudential dimension as it can impact credit supply (Caruana 2010b).

Another important aspect of the system-wide approach is the counter-cyclical buffer of (0-2.5 percent) of common equity or other fully loss absorbing capital, in addition to the CCB, to ensure systemically important financial institutions (SIFIs) possess loss-absorbing capacity beyond the common standards. The cyclical buffer, aimed at achieving the broader macro-prudential goal, will be based on the private sector credit as excess aggregate credit growth have often been associated with systemic risk. It is up to the national supervisors to exercise judgement on the common point of reference and determine when it is necessary to impose such a buffer.²⁷ There is no cost for withdrawal in contrast to the CCB, which imposes some costs if it is drawn down (e.g. restrictions on earning distributions to stakeholders in the form of dividends, discretionary bonuses, etc for banks approaching the regulatory minimum requirements).

Lastly, a non-risk-based leverage ratio (i.e., Tier 1 capital divided by total assets, with no risk weighting) which acts as a backstop (i.e., last resort) is proposed to address the risk of build-up of excessive leverage in the system (Caruana 2010). The backstop leverage ratio ensures that resulting distortions, if any, are within a certain range if risk based capital rules are found to be wrong. In general, the minimum total capital ratio remains at 8 percent but the additional capital conservation buffer increases this ratio to 10.5 percent of risk weighted assets of which 8.5 percent must be Tier 1 capital.

Member countries will start implementing Basel III on 1 January 2013 with the phase-in period extending in some cases to January 2019 (Table 9). For example, the phasing period for the capital conservation buffer is between 1 January 2016 and year end 2018, becoming fully effective on 1 January 2019. However, flexibility is given for national authorities to shorten the phasing period where appropriate.

Table 9: Phase in Arrangements of New Minimum Capital Requirements

	2013	2014	2015	2016	2017	2018	2019
Minimum common equity Ratio	3.5%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer				0.625%	1.25%	1.875%	2.5%
Common equity plus capital conservation buffer	3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
Minimum Tier 1 Capital	4.5%	5.5%	6.0%	6.0%	6.0%	6.0%	6.0%
Total Capital	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Total Capital plus conservation buffer	8.0%	8.0%	8.0%	8.625%	9.125%	9.875%	10.5%

Source: BIS & Danske Markets (2010)

²⁷ However, the Basle Committee on Banking Supervision expects the national authority to invoke this requirement only infrequently.

One of the many questions raised is how Basel II may impact the banking industry in the transitional period. According to the projection of the Institute of International Finance (IIF), the output of the US and Europe would increase by 3 percent in the five years upon adoption of Basel III (Elliot 2010). However, a joint study by the Assessment Group of the FSB and BCBS has analysed this particular issue in detail and found that the increase in the capital requirement does have an impact on bank lending and that the effects are small as long as other conditions necessary for appropriate adjustments are in place. As expected, the study also found that the impact very much depends on the gap between the new regulatory targets and the prevailing capital levels.

Most banks in Asia have reached the minimum capital requirement level of even Basel III (The Star 2010). However, Mervyn King, Governor of the Bank of England, has suggested that the Basel III framework has not raised the capital requirement of banks sufficiently to prevent another potential crisis (King 2010). He based his observations on three criteria. Firstly, a very much higher level of capital than the proposed is needed to counteract a change in sentiment during times of stress. Secondly, the Basel risk-weights approach is based on estimates during normal periods and in times of stress, these valuations become very poor estimates of underlying risks. Thirdly, the Basel framework is still concentrated on the asset side of a bank's balance sheet and is thus, inadequate to deal with risks arising from liquid assets and the risky structure of liabilities. As the financial sector system becomes more sophisticated, as is the case in the more advanced economies, banks are relying less on deposits for their lending and investment activities. Liquidity mismatches may, thus, arise as the net stable funding ratio (NSFR) can be lower than required.²⁸ More explicit elaboration is arguably needed for Basel III on this liquidity issue.

In addition, Binder (2010) has argued that Basel III does not fully address the issue of over reliance on credit ratings. He asserts that rating agencies which have performed poorly on rating mortgage-backed securities and collateralised debt obligations will still have a major role to play in the risk-weighting process under Basel III. Furthermore, he also argues that the process of letting banks use their own internal model to measure risk remains in Basel III and this has proven to be disastrous for Basel II. There will be challenges in implementing Basel III for supervisors across different jurisdictions (Slaughter and May 2010). However, it is fair to say that Basel III is attempting to address systemic issues more methodically. The integrated approach which includes resolution regimes will take into account a combination of capital surcharges, contingent capital and bail-in debt (BIS 2010).

5. Concluding Remarks

The recent global financial crisis posed many policy challenges in the area of prudential and supervisory regulations for policymakers around the globe, including those in the SEACEN region. Macro-financial linkages are becoming increasingly complex and it is thus critical for central bankers to assess the nature of such linkages and strengthen macro-prudential oversight accordingly as traditional monetary and micro-prudential policies are no longer sufficient to address systemic risks.

²⁸ NSFR = [Stable Funding (capital, deposit, etc)]/[Assets*haircut ratio according to liquidity of assets]. This ratio should be higher than 100% (Ito (2010)).

One needs to ask when is the most appropriate time to implement macro-prudential policies. In the short-run, financial markets, being dynamic, are often cautious and can react negatively to any newly introduced pre-emptive policies, even though they are intended for enhancing financial stability. The financial sector, thus, needs to be sound to be able to absorb and withstand the ill-effects of such misconceptions. Another factor to consider is the possibility of yet another round of contagion effects. The global macroeconomic and financial environment remains fragile and volatile. For instance, in late November 2010, the finance ministers of the European countries approved a €85 billion bailout package for the banking crisis in Ireland. The package may have been targeted to deal with the debt-ridden banking sector in Ireland, but the broader aim was to prevent the accelerating debt crisis from engulfing Portugal, Spain and the rest of Europe. However, from another viewpoint, these downside risks present the SEACEN countries with yet another basis to consolidate and support a fully fledged micro-macro prudential framework for achieving greater financial soundness.

As noted earlier, macro-financial linkages can be amplified in an open economy by cross-border spillovers and thus may require similar oversight treatment as if they functioned within national borders. In this respect, cross-border collaboration, information sharing and instituting regional views are essential. It is, therefore, envisaged that The SEACEN Centre, being a regional central banking organisation, could establish itself as a regional platform to share experiences and deliberate on current issues and challenges such as Basel III and its potential implications on the region's banking system.

Finally, it is important to realise that macro-prudential oversight cannot operate in a vacuum. Exactly how such macro-prudential policies and oversights are implemented objectively depends not only on the system's view of the financial sector but also hinge on judgement calls to translate such views into policy prescriptions. Like other macroeconomic policies, the macro-prudential framework must be fused with elements of credibility, transparency and clear objectives. It is, therefore, imperative for the SEACEN countries to continuously pursue reforms to strengthen the financial sector. It is now common knowledge that sound fundamentals coupled with effective micro- and macro-prudential oversight remain the only truly bona fide approach to achieve and maintain financial soundness.

References

- Alfaro, R. and Drehmann, M., (2009), "Macro Stress Tests and Crises: What Can We Learn?", *BIS Quarterly Review*, December.
- Andersen, H., Berge, T.O., Bernhardsen, E., Lindquist, K.G. and Vatne, B.H., (2008), "A Suite-of-Models Approach to Stress-Testing Financial Stability", Norges Bank, *Staff Memo*, No. 2008/2, 3 June.
- Bank Indonesia Website, What is Financial Stability?
<http://www.bi.go.id/web/en/Perbankan/Stabilitas+Sistem+Keuangan/Ikhtisar/Definis+i+SSK/>
- Bayoumi, T. and Melander, O., (2008), "Credit Matters: Empirical Evidences of US Macro-Financial Linkages", *IMF Working Paper*, WP/08/169.
- Bernanke, B.S., (2010), "The Supervisory Capital Assessment Program--One Year Later", Speech Delivered at the Federal Reserve Bank of Chicago 46th Annual Conference on Bank Structure and Competition, Chicago, Illinois, May 6.
- BIS, (2000), Committee of the Global Financial System, Stress Testing By Large Financial Institutions: Current Practice And Aggregation Issues, April.
- BIS, (2009), Basel Committee on Banking Supervision, Consultative Document, Report and Recommendations of the Cross-border Bank Resolution Group *Issued for Comment by 31 December 2009*, September.
- BIS, (2009), Principles for Sound Stress Testing Practices and Supervision, Basel Committee on Banking Supervision, Consultative Document, January.
- BIS, BCBS, Group of Governors and Heads of Supervision Announces Higher Global Minimum Capital Standards, Press Release, 12 September 2010
- Blinder, (2010), "Two Cheers for the New Bank Capital Standards: Why Do We Still Rely on the Rating Agencies, and Why Are We Still Allowing Lehman Brothers Levels of Leverage", Opinion, *Wall Street Journal Online*,
<http://online.wsj.com/article/SB10001424052748704523604575511813933977160.html>.
- Breuer, T., Jandačka, M., Rheinberger, J. and Summer, M., (2009), "How to Find Plausible, Severe, and Useful Stress Scenarios", *International Journal of Central Banking*, September.
- Bunn, P., Cunningham, A. and Drehmann, M., (2005), "Stress Testing as a Tool for Assessing Systemic Risks", Bank of England, *Financial Stability Review*, June.
- Business Times, Zeti, A. A., "No Plans for Capital Curbs", Wednesday, November 24, 2010, 03.17 PM,
http://www.btimes.com.my/Current_News/BTIMES/articles/zards/Article/index.html

Caruana, J., (2010), "Macroprudential Policy: What We Have Learned and Where We Are Going", Key Note speech during Second Financial Stability Conference of the International Journal of Central Banking, Bank of Spain, Madrid, 17 June 2010

Caruana, J., "Macroprudential Policy: Could It Have Been Different This Time?", Speech at the People's Bank of China Seminar on Macroprudential Policy in Cooperation with the International Monetary Fund, Shanghai, Monday 18 October 2010.

Central Bank, Chinese Taipei, Supervisory Structure, Website,
<http://www.cbc.gov.tw/ct.asp?xItem=882&CtNode=492&mp=2>

Cetorelli, N. and Goldberg, L.S., (2008), "Banking Globalization, Monetary Transmission, and the Lending Channel", *NBER Working Paper*, No. 14101.

Cetorelli, N. and Goldberg, L.S., (2009), "Globalized Banks: Lending to Emerging Markets in the Crisis", *Federal Reserve Bank of New York Staff Reports*, No. 337, June.

Chang, R. & Velasco, A., (1998), "Financial Crises in Emerging Markets", *NBER Working Papers* 6606, National Bureau of Economic Research, Inc.

Čihák, M. and Podpiera, R., (2009), "Integrated Financial Supervision: Which Model?", *North American Journal of Economics and Finance*, Vol.19.

Čihák, M., (2004), "Stress Testing: A Review of Key Concepts", Czech National Bank, *CNB Internal Research and Policy Note* No.2.

Committee of European Bank Supervisors (CEBS), (2010), Colleges of Supervisors – 10 Common Principles, January 2009, <http://www.c-ebs.org/getdoc/aeecaf1a-81b5-476a-95dd-599c5e967697/Clean-V3-formatted-CEBS-2008-124-CEIOPS-SEC-08-54-.aspx-2008-124-CEIOPS-SEC-08-54-.aspx>.

Corsetti, G., Pesenti, P. and Roubini, N., (1998), "Paper Tigers? A Model of the Asian Crisis" *NBER Working Papers* 6783, National Bureau of Economic Research, Inc.

Craig, R.S., Davis, E.P and Pascual, A.G., (2006), "Sources of Procyclicality in East Asian Financial Systems", in eds. Gerlach, S and Gruenwald, P, *Procyclicality of Financial Systems in Asia*, International Monetary Fund.

Crockett, A., (2000), "Marrying the Macro- and Micro-Prudential Dimensions of Financial Stability", Remarks, Bank for International Settlements and Chairman of the Financial Stability Forum, before the Eleventh International Conference of Banking Supervisors, held in Basel, 20-21 September.

Danske Markets, (2010), Weekly Credit Updates, 17 September.

De Graeve, F., Kick, T. and Koetter, M., (2008), "Monetary Policy and Financial (In) Stability: An Integrated Micro-Macro Approach", *Journal of Financial Stability*, 4, pp. 205-231.

de Larosière Group, (2009), the de Larosière Report on the High Level Group of Financial Supervision in the EU, Brussels, 25 February.

Deutsche Bank, (2008), "Towards Full Integration of EU Banking Supervision: Using the Momentum - Creating the Integrated Supervisory Regime Necessary for an Integrated Markets" a Position Paper on EU Banking Supervision 16 June.

Eisenbeis, R.A. and Kaufman, G.G., (2008), "Cross-border Banking and Financial Stability in the EU", *Journal of Financial Stability*, Vol.4.

Elliot, D.J., (2010), "Basel III, the Banks, and the Economy", *The Brookings Institution*, July 23,
http://www.brookings.edu/~media/Files/rc/papers/2010/0726_basel_elliott/0726_basel_elliott.

Espenilla, Jr. N. A., (2007), "Banking Supervision and Examination in the Philippines", Slide Presentation at the Financial Stability and Financial Sector Supervision: Lessons From the Past Decade and Way Forward ,Tokyo, Japan, December 17
http://www.imf.org/External/NP/seminars/eng/2007/fsa/pdf/s2/8_S2_speaker4.pdf.

European Financial Service Round-table, (EFS, 2009), Top 10 EFR Messages on Consolidated Supervisions and the College of Supervisors, 10 September,
<http://www.efr.be/members/upload/news/81062EFR%20sept09158.pdf>

Fell, J., (2006), "Overview of Stress Testing Methodologies: From Micro to Macro", Powerpoint Presentation at the Korea Financial Supervisory Commission/Financial Supervisory Service-International Monetary Fund Seminar on Macroprudential Supervision Conference: Challenges for Financial Supervisors, Seoul, November 7,
<http://www.imf.org/external/np/seminars/eng/2006/macopr/pdf/Fell.pdf>

Ferguson Jr., R.W., (2003), "Should Financial Stability be an Explicit Central Bank Objective?", in, Monetary Stability, Financial Stability and the Business Cycle: Five Views, *BIS Papers*, No. 18, September,
<http://www.bis.org/publ/bppdf/bispap18.pdf?noframes=1>

Foot, M., (2003), "What is Financial Stability and How do we Get there?", The Roy Bridge Memorial Lecture , ACI, UK,
April,
<http://www.fsa.gov.uk/Pages/Library/Communication/Speeches/2003/sp122.shtml>

FSA, (2010), Reverse Stress Test,
http://www.fsa.gov.uk/pages/About/What/International/stress_testing/firm_s/reverse_stress_testing/index.shtml

G30, (2008), "The Structure of Financial Supervision: Approaches and Challenges in a Global Marketplace", A Report of the G30 Regulatory Systems Working Group by Chairman Paul A. Volcker and Vice Chairman, Roger W. Ferguson, Jr, G30 report, 6 October 2008, <http://www.group30.org/100608release.pdf>

Gray, D., Merton, R.C. and Bodie, Z., (2007), "New Framework for Measuring and Managing Macrofinancial Risk and Financial Stability," *NBER Working Paper*, No. 13607.
Haldane, A.G., (2009), "Why Banks Failed the Stress Test", Speech Given at the Marcus-Evans Conference on Stress-Testing, London, 13 February.

Hall, M.J.B., (2008), The Sub-prime Crisis, the Credit Squeeze and Northern Rock: the Lessons to be Learned", *Journal of Financial Regulation and Compliance*, Vol. 16, No. 1.

Hardy, D.C. and Nieto, M.J., (2008), "Cross-border Coordination of Prudential Supervision and Deposit Guarantees", *IMF Working Paper*, IMF, WP 08/283.

Hirtle, B., Schuermann, T. and Stiroh, K., (2009), "Macroprudential Supervision of Financial Institutions: Lessons from the SCAP", *Staff Report*, No. 409, Federal Reserve Bank of New York, November.

Ho, D.C., (2010), "Asset Price Bubbles and Challenges to Taiwan's Central Bank", Chapter Nine, in Kim J.H., Asset Price Bubbles and Challenges to Central Banks, The SEACEN Centre.

Holthausen, C. and Rønde, T., (2005), "Cooperation in International Banking Supervision", *Center for Economic Policy Research Discussion Paper Series* No. 4990.
<http://www.ecb.int/pub/pdf/scpwps/ecbwp316.pdf>

Hosoya, M. and Shimizu, T., (2002), "Implications of a Macro Stress Test on Financial Stability: Summary of the Second Census on Stress Tests", *Market Review*, Bank of Japan, No 2002-E-4, December.

Houben, A., Kakes, J. and Schinasi, G., (2004), "Toward a Framework for Safeguarding Financial Stability", *IMF Working Paper* WP/04/101.

IMF, (2010), "Bank Stress Tests, What Is a Bank Stress Test?", *IMF Survey Online*, July 29,
<http://www.imf.org/external/pubs/ft/survey/so/2010/pol072910a.htm>

IMF World Economic Outlook, October 2010.

Ingves, S., (2007), "Regulatory Challenges of Cross-border Banking: Possible Ways Forward", Paper Presented at Reserve Bank of Australia, Sydney, Australia , 23/July,
<http://www.riksbank.se/templates/Page.aspx?id=25321>

Kaminsky, G. and Reinhart, C., (1999), "The Twin Crises: The Causes of Banking and Balance of Payments Problems", *The American Economic Review*, Vol. 89, No.3, pp. 473-500, June.

Kashyap, A.K., (2010), "Examining the Link Between Fed Bank Supervision and Monetary Policy, Testimony, House Financial Services Committee. March 17,
<http://faculty.chicagobooth.edu/brian.barry/igm/kashyaptestimony.pdf>.

Kay, J., (2010), "Banking Needs More Robust Stress Tests Than These", July 27, Financial Times, <http://www.ft.com/cms/s/0/18156e7c-99ae-11df-a852-00144feab49a.html>

Keasey, K. and Veronesi, G., (2008), "Lessons from the Northern Rock Affair", *Journal of Financial Regulation and Compliance*, Vol. 16, No. 1.

King, M., (2010), "Banking: From Bagehot to Basel, and Back Again", Speech at the Second Bagehot Lecture Buttonwood Gathering, New York City on Monday 25 October.
<http://www.bankofengland.co.uk/publications/speeches/2010/speech455.pdf>

Kirchfeld, A. and Clark, S., (2010), "Deutsche Bank CEO Says EU Stress Tests Could Be 'Dangerous'", Bloomberg News, <http://www.bloomberg.com/news/2010-06-10/ackermann-says-publishing-bank-stress-tests-data-could-be-very-dangerous-.html>

Kishan, R.P. and Opiela, T.P., (2000), "What Do a Million Observations on Banks Say About the Transmission of Monetary Policy?", *American Economic Review*, Vol.90, No.3.

Kodres, L. and Narain, A., (2009), "What is to be Done", *Finance and Development*, IMF, No. 1, Vol.46, March.

Konishi, A., Opening Speech, at the Capital Flows Management Workshop, Asian Development Bank, 12 October 2010, Ha Noi, Viet Nam,
<http://www.adb.org/Documents/Speeches/2010/sp2010065.asp>.

Lindgren, C.J., (2007), "Monetary and Supervisory Policies and Banking System Soundness: An Overview in Financial System Soundness and Risk-Based Supervision", Edited Villanueva, D., The SEACEN Centre.

Llewellyn, D.T., (2009), "The Northern Rock Crisis: A Multi-Dimensional Problem in the Failure of Northern Rock in The Failure of Northern Rock", A Multi-Dimensional Case Study, Edited By Franco Bruni and David T. Llewellyn, Papers Presented in SUERF, The European Money and Finance Forum, Vienna.,
<http://www.suerf.org/download/studies/study20091.pdf>.

Llewellyn, D.T., (2008), "The Northern Rock Crisis: A Multi-Dimensional Problem, Waiting to Happen", *Journal of Financial Regulation and Compliance*, Vol. 16, No.1.

Macroeconomic Assessment Group Established by the Financial Stability Board and the Basel Committee on Banking Supervision Interim Report Assessing the Macroeconomic Impact of the Transition to Stronger Capital and Liquidity Requirements August 2010,
<http://www.bis.org/publ/othp10.pdf?noframes=1>

Nagy, P.M., (2009) "Stress Testing of Banks And Policy Implications", EBRP Blog, European Bank for Reconstruction and Development, 31 July,
<http://www.ebrdblog.com/wordpress/2009/07/stress-testing-of-banks-and-policy-implications>

- Nakornthab, D., (2010), "Household Indebtedness and Its Implications for Financial Stability", *Research Project Paper*, The SEACEN Centre, Kuala Lumpur, Malaysia.
- Nijathaworn, B., (2010), "Regional Financial Supervision – Challenges and the Way Forward for Asia, Remarks at the Conference on Macroeconomic and Financial Stability in Asian Emerging Markets, Organised by the Bank Negara Malaysia and Asian Development Bank Institute, Kuala Lumpur, 4 August 2010.
- Pan, J.P.E., (2010), "Challenge of International Cooperation and Institutional Design in Financial Supervision: Beyond Transgovernmental Networksshiva", *Chicago Journal of International Law*, Vol. 11.
- Ponce, J., (2010), "Who Should Decide on Emergency Liquidity Assistance?", Research-based Policy Analysis and Commentary From Leading Economists, 16 January.
- Roldán, J.M., (2005), "Path to Effective Supervision – Convergence of Practices in Europe", Slide Presentation at the First EU/US Retail Banking Forum organised by the WSBI/ESBG, Brussels, 14 November.
- Saccomanni, F., (2009), "Fact-Finding for the Examination of the Communication of the European Commission on European Financial Supervision", Testimony Before the Finance Committee of the Chamber of Deputies, Rome, 15 September, *BIS Review* No. 119. <http://www.bis.org/review/r091006e.pdf>.
- Schinasi, G.J., (2004), "Defining Financial Stability", *Working Paper* WP/04/187, IMF.
- Siregar, R.Y., (2010), "Macro-Prudential Approaches to Banking Regulation: Perspectives of Selected Asian Central Banks", Paper Presented at the Conference on Banking and Financial Stability in Asian Emerging Markets, Organised Jointly by the Asian Development Bank Institute and Bank Negara Malaysia, Kuala Lumpur, August 4.
- Siregar, R.Y. and Choy, K.M., (2010), "Determinants of International Bank Lending from the Developed World to East Asia", *IMF Staff Papers*, Vol. 57, No.2, pp. 484-516.
- Siregar, R.Y. and Lim, C.S., Vincent, (2010), "The Role of Central Banks in Sustaining Economic Recovery and in Achieving Financial Stability" *Journal of Advanced Studies in Finance*, Vol.1, Summer.
- Siregar, R.Y., and James, W.E., (2006), "Designing an Integrated Financial Supervision Agency: Selected Lessons and Challenges for Indonesia", *ASEAN Economic Bulletin*, Vol. 23, No.1
- Slaughter and May, Basel 3 Agreements at Last but Question Remains, Briefing, September 2010, http://www.slaughterandmay.com/media/1466594/basel_3_agreement_at_last_but_questions_remain.pdf
- Sorge, M., (2004), "Stress-testing Financial Systems: An Overview of Current Methodologies", *BIS Working Papers*, No. 165, December.

Subhanij, T., (2010), "Liquidity Measurement and Management in the SEACEN Countries", *Research Project Paper*, The SEACEN Centre, Kuala Lumpur, Malaysia.

Subhaswadikul, M., (2010), "Stress-Testing: The Experience of Bank of Thailand", Power Point Presentation at the 3rd SEACEN-Deutsche Bundesbank Intermediate Course on Banking.

Sundararajan, V., Enoch, C.H., San José, A., Hilbers, P., Krueger, R., Moretti, M., and Slack, G., (2002), "Financial Soundness Indicators: Analytical Aspects and Country Practices", *Occasional Paper* No. 212 IMF.

The STAR, (2010), Basel III Eases Asia Bank Capital Raising Fears, September 14.

Tarullo, D.K., (2010), Lessons from the Crisis Stress Tests, Speech Presented at the Federal Reserve Board International Research Forum on Monetary Policy, Washington, D.C., March 26.

<http://www.federalreserve.gov/newsevents/speech/tarullo20100326a.htm>

The Committee of European Banking Supervisors (CEBS, 2007), Range of Practices on Supervisory Colleges and Home-Host Cooperation, December,

[http://www.cebs.org/getdoc/93f97617-daff-4d96-8248-b214e231c28c/CEBS-2007-75-\(Range-of-practices\)-final-\(1\).aspx](http://www.cebs.org/getdoc/93f97617-daff-4d96-8248-b214e231c28c/CEBS-2007-75-(Range-of-practices)-final-(1).aspx)

The Economist, (2010), "Agents of Change, Conventional Economic Models Failed to Foresee the Financial Crisis. Could Agent-based Modelling Do Better?", *Economic Focus*, Jul 22.

The Institute of International Finance, Inc, Capital Flows to Emerging Markets, 4 October 2010, <http://www.iif.com/press/press+161.php>

The Local, (2010), Germany Agrees to Release Bank Stress Tests, 17 Jun, <http://www.thelocal.de/money/20100617-27929.html>

Thomas Breuer, T., Jandačka, M., Rheinberger, J. and Summerb, M., (2009), "How to Find Plausible, Severe, and Useful Stress Scenarios", *International Journal of Central Banking*, September.

Trichet, J.C., (2007), "Towards the Review of the Lamfalussy Approach: Market Developments, Supervisory Challenges and Institutional Arrangements", Keynote Speech at the First CEBS Conference, London, 9 May.

Trichet, J.C., (2005), Opening Remarks, Press Briefing on the ECB Financial Stability Review, Frankfurt am Main, 31 May.

http://www.ecb.int/press/key/date/2005/html/sp050531_1.en.html

Véron, N., (2008), Supervisory Colleges: Way Forward or Red Herring?, French in La Tribune, November 26, http://veron.typepad.com/files/tribune_081126_en.pdf.

Wall, L.D., (2009), "Prudential Discipline for Financial Firms: Micro, Macro, and Market Structures", *ADB Working Paper* No. 176, December.

Woolford, I., (2001), "Macro-financial Stability and Macro-prudential Analysis", *Reserve Bank of New Zealand Bulletin*, Vol. 64, No.3.

Yellen, J.L., (2010), "Macroprudential Supervision and Monetary Policy in the Post-Crisis World", Speech at the Annual Meeting of the National Association for Business Economics, Denver, Colorado, October 11.

Zeti, A.A., (2005) Governor's Keynote Address at the Public-Private Dialogue Session of the 7th SEACEN Conference of Directors of Supervision of Asia Pacific Economies, Kuala Lumpur , 4 August.